United States Department of Agriculture

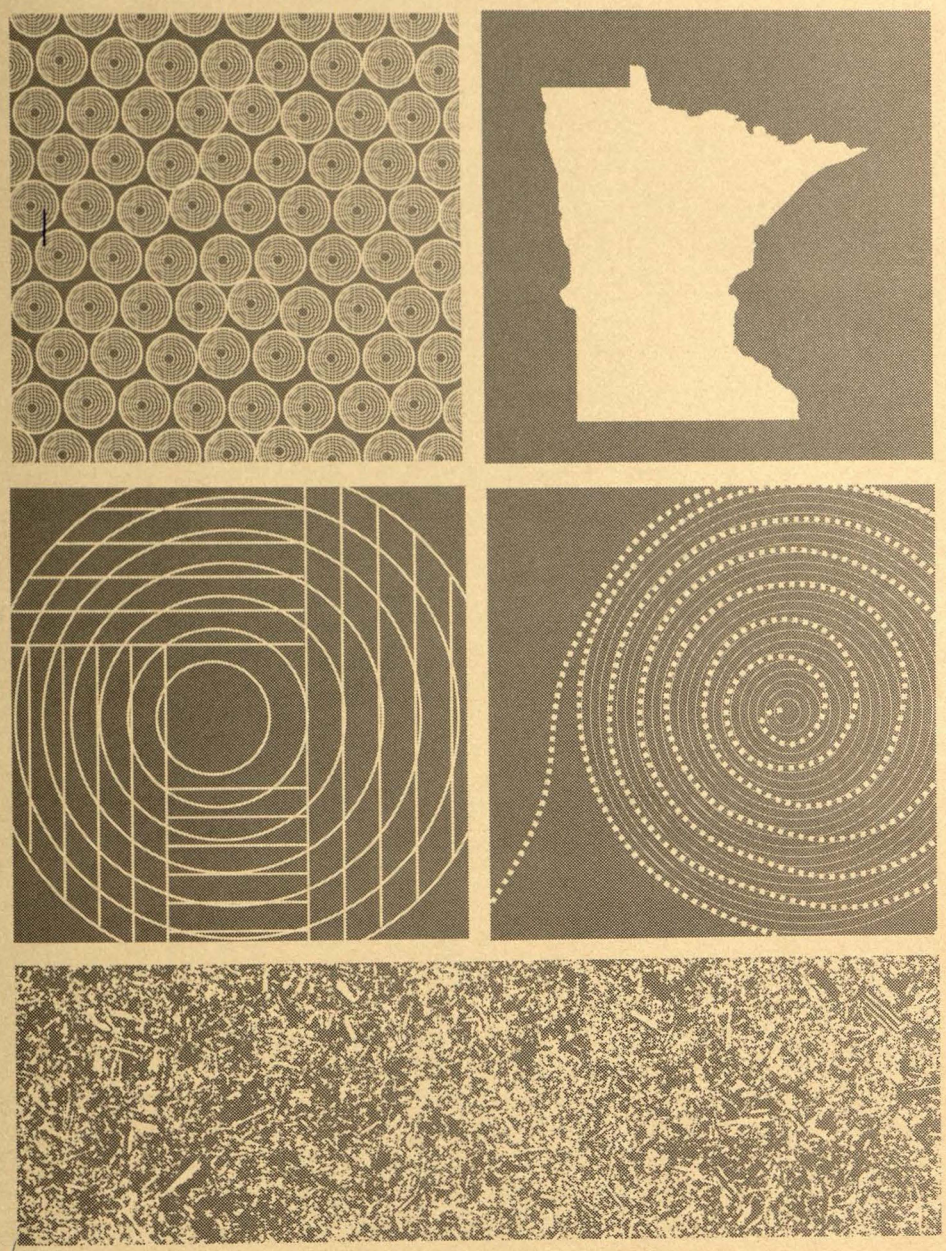
Forest Service

North Central Forest Experiment Station

Resource Bulletin **NC-143**

Minnesota Timber Industry—An Assessment of Timber Product Output and Use, 1990

Ronald L. Hackett and Richard A. Dahlman



ACKNOWLEDGMENT

We thank the following Minnesota Department of Natural Resources personnel who canvassed mills in the State of Minnesota:

Minnesota Department of Natural Resources Utilization & Marketing Program

John Kranz, Program Supervisor
Rick Dahlman, Program Specialist
Jeff Edmonds, Northwest Region Specialist
Carl Prosek, Northeast Region Specialist
Paul Peterson, Central Region Specialist
Phil Vieth, Southern Region Specialist

North Central Forest Experiment Station
Forest Service—U.S. Department of Agriculture
1992 Folwell Avenue
St. Paul, Minnesota 55108
Manuscript approved for publication April 8, 1993
1993

FOREWORD

In this bulletin we discuss recent Minnesota forest industry trends and report the results of a detailed study of forest industry, industrial roundwood production, and associated primary mill wood and bark residue in Minnesota in 1990. Such detailed information is necessary for intelligent planning and decisionmaking in wood procurement, forest resource management, and forest industry development. Likewise, researchers need current forest industry and industrial roundwood information for planning projects.

Special thanks are given to the primary wood-using firms that supplied information for this study and to the Minnesota Department of Natural Resources personnel for their diligent efforts in data collection and followup. Their cooperation is greatly appreciated.

All board foot data in this report have been converted to International 1/4-inch scale by applying a multiplier of 1.08 to all saw-log volume reported in Scribner Decimal C scale by sawmills, a multiplier of 1.04 to all veneer log volume reported in Scribner Decimal C scale by veneer mills, a multiplier of 1.38 to all saw-log volume reported in Doyle scale by sawmills, and a multiplier of 1.14 to all veneer log volume reported in Doyle scale by veneer mills.

The last Forest Service report from a detailed study of all industrial roundwood output in Minnesota was published in 1988. Most comparisons in this report are with the 1988 study results.

CONTENTS

Page

Highlights 1
Primary Timber Industry—Industrial Roundwood 1
Pulpwood 1
Saw Logs 3
Veneer Logs 4
Other Products 4
Timber Removals 4
Harvest Residue 5
Primary Mill Residue 5
Appendix 6
Study Methods 6
Sample Questionnaire 7
Definition of Terms 10
Common and Scientific Names of Tree Species Mentioned in This Report 11
Table Titles 11
Acknowledgment 12
Tables 13

Minnesota Timber Industry—An Assessment of Timber Product Output and Use, 1990

Ronald L. Hackett and Richard A. Dahlman

HIGHLIGHTS

PRIMARY TIMBER INDUSTRY—INDUSTRIAL ROUNDWOOD

- Industrial roundwood production (harvest) increased from 223.8 million cubic feet in 1988 to 234.4 million cubic feet in 1990. Annual production of hardwoods increased an average of 7 percent, but softwood production declined an average of 3 percent.
- Pulpwood accounted for 76 percent of all industrial roundwood production in 1990.
- Industrial roundwood receipts (received) at active mills were 234.3 million cubic feet. Hardwood receipts increased 9 percent and softwood receipts increased 3 percent since 1988.
- To produce the 1990 volume of industrial roundwood (excluding residential fuelwood), 342.7 million cubic feet of total wood material was harvested from Minnesota timberlands. Sixty-nine percent of this total was harvested from growing-stock material; 108.3 million cubic feet of this material was left in the woods as harvest residues. This residual material included tops, limbs, growing-stock residues (pieces of merchantable log), and cull material.
- Aspen supplied 64 percent of the total growing stock harvested in 1990.

In terms of volume of wood used, pulp mills dominate Minnesota's forest industry; but sawmills far outnumber any other mill category. There were 572 mills of all types operating in Minnesota in 1990. Sixty-one percent of these mills were in the Aspen-Birch and Northern Pine Forest Survey Units. The Forest Survey Units of Minnesota are shown in figure 1.

PULPWOOD

- Minnesota produced a record high of 2.35 million cords of pulpwood (including residues) in 1990. Pulpwood comprises all fiber-based products made from roundwood and residues used in the manufacture of paper, particleboard (see Definition of terms), oriented strand board (OSB), and waferboard.
- Aspen constituted 73 percent of the roundwood pulpwood cut. New and expanding OSB and paper mills have further increased the dominant position of aspen in Minnesota (fig. 2).
- Production of the leading pulpwood species, aspen, has increased 10 percent (157 thousand cords) from 1988.
- Minnesota pulp mills have procured most—96 percent—of their wood requirements from within the State. Wisconsin

---

Ronald L. Hackett, Research Forester, received a B.S. in forest resources from the University of Minnesota. He joined the Forest Service in December 1974 and has been working with the North Central Station's Forest Inventory and Analysis Unit since.

Richard A. Dahlman is a Marketing and Utilization Specialist with the Minnesota Department of Natural Resources, Division of Forestry. He received a B.S. in forest resources and an M.S. in forest ecology from the University of Minnesota. He joined the DNR in 1979 after working in private industry.

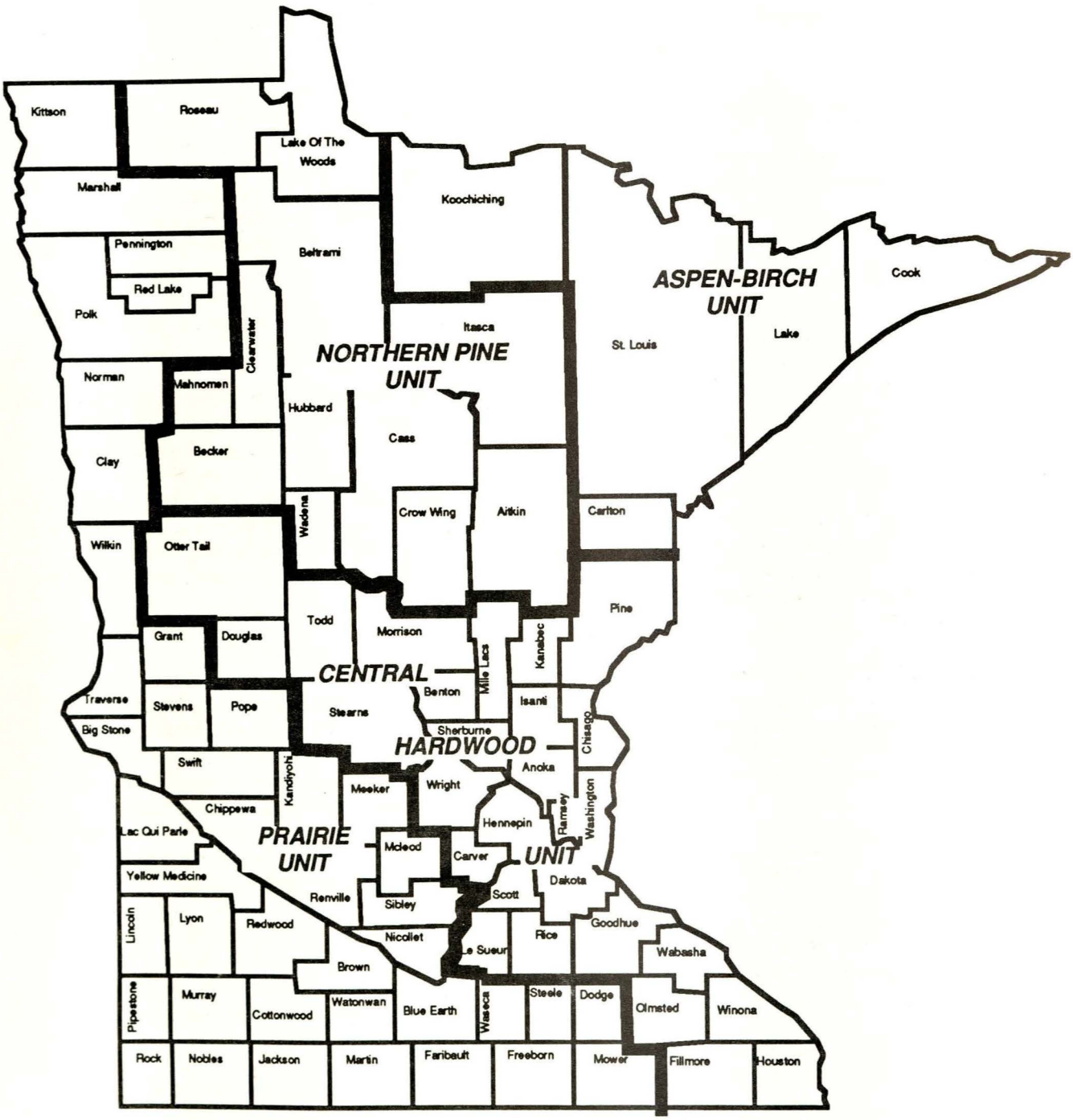


Figure 1.—*Forest Survey Units in Minnesota.*

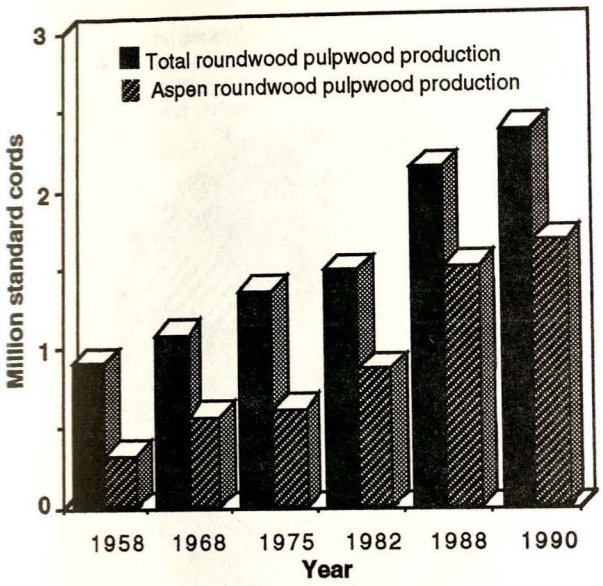


Figure 2.— *Roundwood pulpwood production of aspen and all other species in Minnesota for selected years.*

provides 3.6 percent (83 thousand cords) of mostly aspen, balsam fir, and spruce for pulpwood use.

- Pulpwood exports to other States are minimal. Ninety-three percent of pulpwood cut in Minnesota in 1990 remained in the State.

Pulpwood production is a major industrial product in Minnesota. Surveys of pulpwood mills are done yearly. For more information and data on pulpwood production in Minnesota and the North Central Region, see "Pulpwood production in the north-central region, 1990."

SAW LOGS

- In 1990, 264.6 million board feet of saw logs were harvested in Minnesota—a decrease of 42.4 million board feet (14 percent) from 1988.

- Principal saw-log species harvested were aspen (83 million board feet), red oak (42 million board feet), and pine (69 million board feet).

- Major production gains since 1988 were in white birch (4 million board feet), basswood (379 thousand board feet), and aspen (312 thousand board feet) (fig. 3). Major declines since 1988 occurred in jack pine, red pine, white pine, red oak, and elm. The decline in pine production was mainly due to the shut down of a major mill for part of the year as it was relocated.

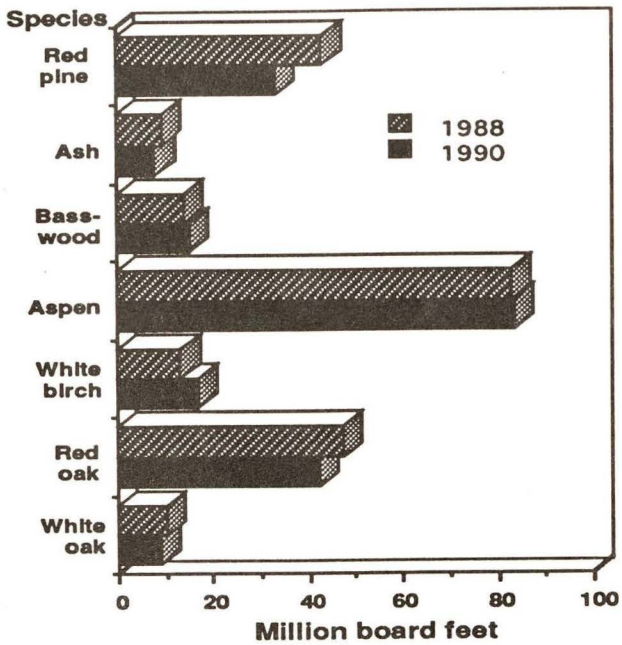


Figure 3.— *Saw-log production by selected species in Minnesota, 1988 and 1990.*

- Four percent of the Minnesota saw-log production was exported in 1990. Primary hardwood exports were red oak to Wisconsin and basswood to Iowa. Softwood exports consisted mainly of jack and red pine, balsam fir, and spruce headed for States outside the region.

- Leading saw-log producing counties (more than 20 million board feet) were Itasca, Koochiching, Cass, and St. Louis.

- Five counties in southeastern Minnesota produced 48 percent (20 million board feet) of the red oak saw-log volume in 1990. They were Fillmore, Houston, Goodhue, Wabasha, and Winona Counties.

- Minnesota imported a total of 4.9 million board feet of saw logs primarily from Wisconsin and Iowa. Major species imported as saw logs were red and jack pine from Wisconsin and red oak from Iowa.

VENEER LOGS

- Loggers cut 16.7 million board feet of veneer logs in 1990, up 3 percent from 1988. Of the veneer log and bolt volume, 63 percent remained in Minnesota, 10 percent was shipped to Wisconsin, and the remainder was sent to other States and Canada.

- White birch was the primary species cut for veneer logs and bolts in Minnesota in 1990, followed by basswood, aspen, and ash. Basswood and ash were the main veneer log and bolt exports from Minnesota.

- In 1990, 4.1 million board feet of veneer logs and bolts from Minnesota was sent overseas to the Pacific Rim and European countries. The major species exported overseas were basswood (1.9 million board feet), ash (1.2 million board feet), oaks (0.6 million board feet), and walnut (0.3 million board feet).

- White birch and aspen were the only species reported as undergoing secondary processing in Minnesota in 1990.

OTHER PRODUCTS

- Other industrial roundwood products totalling 5.3 million cubic feet (2 percent of all industrial roundwood) were cut in Minnesota in 1990 (fig. 4). These other products include roundwood harvested for commercial posts and poles, industrial fuelwood, shaving bolts, and excelsior bolts.

- Industrial fuelwood—roundwood harvested from timberland and used to fuel boilers for heat and/or electrical generation—production in Minnesota was 683 thousand cubic feet or 13 percent of the other products category. White birch was the major species cut for industrial fuelwood with 5,750 cords or 56 percent of the industrial fuelwood harvested in 1990.

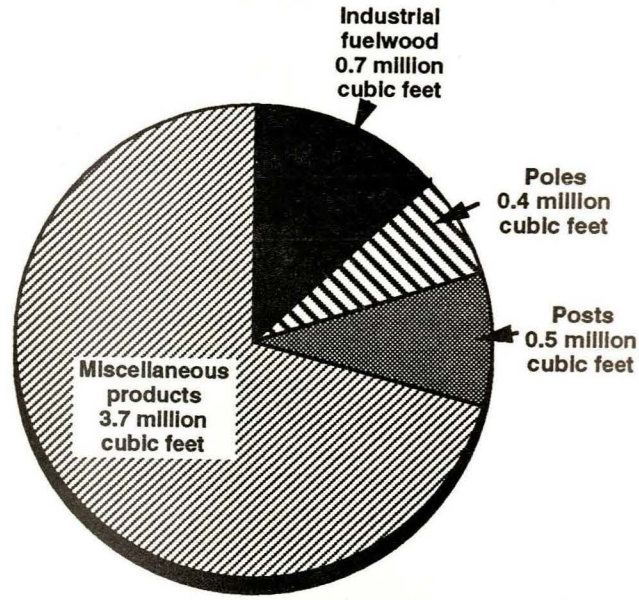

Industrial fuelwood 0.7 million cubic feet
Poles 0.4 million cubic feet
Posts 0.5 million cubic feet
Miscellaneous products 3.7 million cubic feet

Figure 4.— *Distribution of other products in Minnesota in 1990.*

- Miscellaneous products—shavings and excelsior—constituted 70 percent of the other products category; aspen was the leading species of miscellaneous products.

Residential fuelwood is a major nonindustrial product in Minnesota. The results of a 1990 residential fuelwood study are the subject of a separate Station publication, "Residential fuelwood production and sources from roundwood in Minnesota, 1988."

TIMBER REMOVALS

- In the production of Minnesota's 1990 industrial roundwood harvest, 236 million cubic feet of growing stock was removed from timberlands, a 5-percent increase since 1988.

- Total amount of material harvested for roundwood products (excluding residential fuelwood) from timberland was 342.7

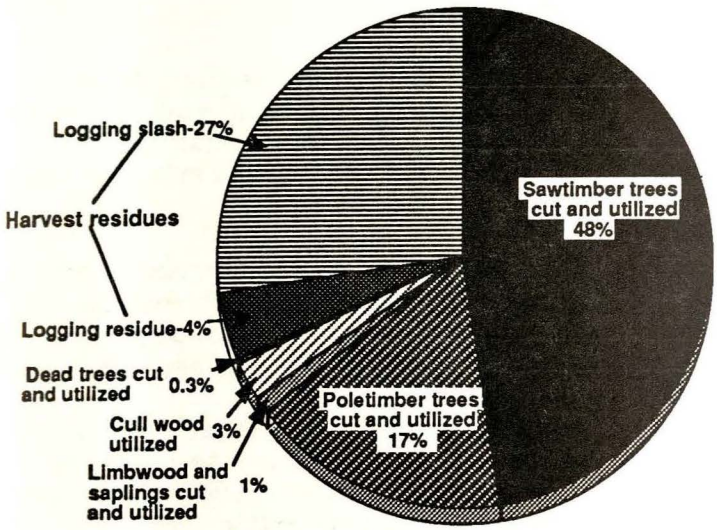

Logging slash-27%
Harvest residues
Logging residue-4%
Dead trees cut and utilized 0.3%
Cull wood utilized 3%
Limbwood and saplings cut and utilized 1%
Sawtimber trees cut and utilized 48%
Poletimber trees cut and utilized 17%

Figure 5.— *Distribution of material harvested from timberland for industrial roundwood in Minnesota, 1990.*

million cubic feet. Thirty-two percent (108.3 million cubic feet) of this total was left in the woods as logging residue (fig. 5). Residue material included tops, limbs, cull material, and growing-stock material not used for products.

- Major species harvested from both growing stock and sawtimber were aspen, pine, and oak.

HARVEST RESIDUE

- In 1990, loggers in Minnesota left an estimated 108.3 million cubic feet of unused wood material on harvested timberlands. Of this, 14.9 million cubic feet was growing-stock material and 93.4 million cubic feet was nongrowing-stock material.

- Aspen accounted for 60 percent of all harvest residues in 1990.

- Loggers in the Northern Pine Unit produced 50 percent of the harvest residue in Minnesota. Itasca County reported 17.6 million cubic feet of harvest residue, second only to St. Louis County with 19.2 million cubic feet in 1990.

PRIMARY MILL RESIDUE

- Seventy-five percent of the total residue generated at Minnesota primary mills was used.

- Minnesota primary wood-using mills (except the pulp, particleboard, and waferboard mills) generated 356 thousand green tons of coarse residue, 218 thousand green tons of fine residue, and 1,054 thousand green tons of bark in 1990.

- Eighty-three percent of all coarse residues were used. Pulp mills consumed 44 percent (155 thousand tons) of all coarse mill residues for fiber products, and industry and households consumed 33 percent (118 thousand tons) for fuel.

- Twenty-six percent of all fine residues (95 thousand tons) and 90 percent (947 thousand tons) of bark were used for industrial fuelwood.

APPENDIX

STUDY METHODS

Data for this publication came from responses to a mail questionnaire (see following pages) sent to all known veneer mills, specialty mills (poles, piling, etc.), and all Minnesota primary sawmills that processed more than 100 thousand board feet of logs and bolts in 1990. Sawmills processing less than 100 thousand board feet were contacted to verify ongoing operations. Data from a 1985 Minnesota Department of Natural Resources study of those mills were duplicated to reduce the data collection workload. Because these mills contributed less than 10 percent of the total production, the impact of this procedure on sampling error is considered negligible.

The study was a cooperative effort of the Minnesota Department of Natural Resources (MDNR) and the North Central Forest Experiment Station (NCFES). All canvassing in Minnesota (except pulp mills) was done by the MDNR using mail and personal contact; followup of nonrespondents was by mail, telephone, and personal contact. MDNR utilization and marketing specialists provided estimates based on prior knowledge and contacts for a few Minnesota mills that did not furnish complete data.

The NCFES mailed a questionnaire to all pulp mills and all out-of-State mills that use Minnesota roundwood. Followup of nonrespondents was by mail and telephone.

Logging utilization factors were used to estimate growing-stock and sawtimber removals and the volume of logging residue generated during harvesting operations. These factors were determined for saw logs and pulpwood from the 1989-1990 Minnesota Logging Utilization Study conducted as part of the new Minnesota forest inventory by NCFES. Utilization factors for other products were established during earlier studies in the Lake States.

The NCFES edited and compiled the data.

Form Approved
OMB No. 0596-0010

LOGS AND OTHER WOOD PROCESSED IN 1990

MINNESOTA

This form is for reporting the quantities and kinds of logs and other wood processed by this plant in 1990, and the disposition of the wood residues resulting from this operation.

All replies will be held confidential and used only for statistical reports.

☐ Check here if you wish to receive a copy of the report resulting from this study.

Plant or company name: _____

Mailing address: _____

Plant location: _____

Person to contact about this report: _____

Types of wood processed in 1990 *Check only one kind of product. If more than one kind was received, fill out a separate form for each.*

14-15

01	☐	Saw logs & bolts-- includes veneer logs sawn
02	☐	Veneer logs & bolts cut into veneer
03	☐	Cooperage logs and bolts
06	☐	Piling
07	☐	Poles

09	☐	Industrial fuelwood
10	☐	Posts
11	☐	Charcoal wood
12	☐	Other (specify) _____

☐ Check here if no wood was processed in 1990 and return the form.

Total volume of above-checked product that was processed in 1990.

Conifer (pine, cedar, etc.) _____ (27-36) Hardwood (includes cottonwood) _____ (37-46)

DO NOT WRITE IN THIS BLOCK

Cols. 1-5 = **61100**

MILL	STATE	COUNTY
XXX	XX	XXX
6-8	9-10	11-13

FACTOR
XXX
47-49

50

A self-addressed envelope is provided for your convenience.

This survey is authorized by PL 93-378 as amended by PL 94-588. Your cooperation is appreciated and needed to make the results of this survey comprehensive, accurate, and timely, although you are not required to respond.

LOGS and OTHER WOOD PROCESSED IN 1990.

∞ Do not include logs or bolts sold or transferred to other companies. Enter quantity processed opposite species in appropriate columns showing survey units, other states and Canada where the logs and bolts were harvested. The State map on page 4 shows unit boundaries. If the unit of measure is board feet, indicate the log rule or lumber tally. ☐ Doyle ☐ International ☐ Scribner ☐ Lumber tally
If cords, specify size _____. If weight, specify pounds per thousand board feet _____ or pounds per cord _____.

Cols. 1-5 = 612xx or 613xx

Species	Unit of measure: Board feet ☐ Cords ☐ Cubic feet ☐ Lineal feet ☐ Pieces ☐ Weight ☐ Other ☐ _____		FROM MINNESOTA (enter name of county immediately below)								OTHER STATES AND CANADA (enter name below)	
			XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
Cedar	1											
Balsam fir	2											
Hemlock	3											
Jack pine	4											
Red pine	5											
White pine	6											
Spruce	7											
Tamarack	8											
Ash	9											
Aspen	10											
Balsam poplar	11											
Basswood	12											
Beech	13											
White birch	14											
Yellow birch	15											
Cottonwood	16											
Elm	17											
Hickory	18											
Hard maple	19											
Soft maple	20											
Red oak	21											
White oak	22											
Walnut	23											
Other (specify)	24											
TOTAL												

DISPOSAL OF PLANT RESIDUES IN 1990 BY TYPE AND USE, for product checked on page 1

Instructions: Please enter your best estimate of the **percentage of each type of plant residue** that was used for the various purposes indicated

Cols. 1-5 = 615xx

DISPOSAL OF RESIDUE	BARK		COARSE RESIDUES (Suitable for chipping such as slabs, edgings, etc.)		FINE RESIDUES (Sawdust, veneer, clippings, etc. not suitable for chipping)	
	1 Conifer	2 Hardwood	3 Conifer	4 Hardwood	5 Conifer	6 Hardwood
	XX	XX	XX	XX	XX	XX
1. USED FOR:						
a. Manufacture of fiber products such as pulp, hardboard, or roofing felt 1	%	%	%	%	%	%
b. Charcoal or chemical wood 2	%	%	%	%	%	%
c. Industrial fuel at this or other mill 3	%	%	%	%	%	%
d. Domestic household fuel -- sold or given away 4	%	%	%	%	%	%
e. Miscellaneous uses such as livestock bedding, mulch, small dimension, and specialty items. 5	%	%	%	%	%	%
2. NOT USED: (Including land fill and residues burned as waste. 6	%	%	%	%	%	%
3. TOTAL	%	%	%	%	%	%

DEFINITION OF TERMS

Coarse mill residue.—Wood residue suitable for chipping such as slabs, edging, and veneer cores.

Fine mill residue.—Wood residue not suitable for chipping such as sawdust and veneer clippings.

Forest Survey Unit.—A geographic area (group of counties) used by the Forest Inventory and Analysis Project to report periodic inventories and use of forest resources.

Harvest residues.—The total unused wood material left after harvesting.

Industrial roundwood products.—Saw logs, pulpwood, veneer logs, poles, commercial posts, piling, cooperage logs, particleboard bolts, shaving bolts, lath bolts, charcoal bolts, and chips from roundwood used for pulp or board products.

Industrial roundwood production.—The quantity of industrial roundwood harvested in a geographic area.

Industrial roundwood receipts.—The quantity of industrial roundwood received by commercial mills.

Logging residue.—The unused portions of the merchantable section of growing-stock trees cut or killed by logging.

Logging slash.—The unused portion of an unmerchantable section of tree cut or killed by logging.

Particleboard.—A generic term for a panel manufactured from lignocellulosic materials—commonly wood—essentially in the form of particles produced by compressing and bonding small particles of wood. Includes panels made from shavings, flakes, wafers, chips, sawdust, strands, slivers, or wood wool.

Primary wood-using mills.—Mills receiving roundwood or chips from roundwood for processing into products.

Primary wood-using mill residue.—Wood materials (coarse and fine) and bark generated at manufacturing plants from roundwood processed into principal products. These residues include wood products (byproducts) obtained incidental to production of principal products and wood materials not utilized for some product.

Roundwood.—Logs, bolts, or other round sections cut from trees (including chips from roundwood).

Standard cord.—A stack of wood bolts (or the equivalent) encompassing 128 cubic feet of wood, bark, and air space. A cord of pulpwood in the North Central Region is assumed to contain 79 cubic feet of wood and 49 cubic feet of bark and air space. Most industries in Minnesota report cordwood volume in 100-inch cords or Lake States cords. These data are converted to 96-inch standard cord equivalents for this report.

Timberland.—Forest land producing, or capable of producing, crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Generally, this includes areas suitable for growing crops of industrial wood in excess of 20 cubic feet per acre annually.

Veneer log.—A log considered suitable in size and quality for producing veneer-sliced or rotary-cut.

COMMON AND SCIENTIFIC NAMES OF TREE SPECIES MENTIONED IN THIS REPORT

SOFTWOODS
Jack pine ..... *Pinus banksiana*
Red pine ..... *Pinus resinosa*
Eastern white pine ..... *Pinus strobus*
Spruce
  White spruce ..... *Picea glauca*
  Black spruce ..... *Picea mariana*
Balsam fir ..... *Abies balsamea*
Tamarack ..... *Larix laricina*
Northern white-cedar ..... *Thuja occidentalis*
Other softwoods
  Eastern redcedar ..... *Juniperis virginiana*
  Scotch pine ..... *Pinus sylvestris*
HARDWOODS
White oak
  White oak ..... *Quercus alba*
  Bur oak ..... *Quercus macrocarpa*
  Swamp white oak ..... *Quercus bicolor*
Red oak
  Northern red oak ..... *Quercus rubra*
  Black oak ..... *Quercus velutina*
  Northern pin oak ..... *Quercus ellipsoidalis*
Hickory
  Bitternut hickory ..... *Carya cordiformis*
  Shagbark hickory ..... *Carya ovata*
White birch ..... *Betula papyrifera*
Yellow birch ..... *Betula alleghaniensis*
Hard maple
  Black maple ..... *Acer nigrum*
  Sugar maple ..... *Acer saccharum*
Soft maple
  Red maple ..... *Acer rubrum*
  Silver maple ..... *Acer saccharinum*
Ash
  Black ash ..... *Fraxinus nigra*
  White ash ..... *Fraxinus americana*
  Green ash ..... *Fraxinus pennsylvanica*
Balsam poplar ..... *Populus balsamifera*
Aspen
  Bigtooth aspen ..... *Populus grandidentata*
  Quaking aspen ..... *Populus tremuloides*
Eastern cottonwood ..... *Populus deltoides*
American basswood ..... *Tilia americana*
Black walnut ..... *Juglans nigra*
Elm
  American elm ..... *Ulmus americana*
  Rock elm ..... *Ulmus thomasii*
  Slippery elm ..... *Ulmus rubra*
Other hardwoods
  Black cherry ..... *Prunus serotina*
  River birch ..... *Betula nigra*
  Butternut ..... *Juglans cinerea*
  Black willow ..... *Salix nigra*
  Boxelder ..... *Acer negundo*
  Hackberry ..... *Celtis occidentalis*
  Kentucky coffeetree ... *Gymnocladus dioicus*

TABLE TITLES

Table 1.—Number of active primary wood using mills in Minnesota 1975, 1988, and 1990

Table 2.—Industrial roundwood receipts by type of mill in Minnesota 1975, 1988, and 1990

Table 3.—Industrial roundwood production by Forest Survey Unit, by species group, and type of product, Minnesota, 1990

Table 4.—Material harvested on timberland for industrial roundwood production by source of material and species group, Minnesota, 1990

Table 5.—Minnesota pulpwood production by species group, 1946-1990

Table 6.—Minnesota pulpwood production by species group and destination, 1990

Table 7.—Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Minnesota, 1990

Table 8.—Pulpwood receipts in Minnesota by species group, 1946-1990

Table 9.—Pulpwood receipts in Minnesota by area of origin, 1960-1990

Table 10.—Minnesota pulpwood receipts by species group and area of origin, 1990

Table 11.—Saw-log production and receipts in Minnesota by species group, 1988 and 1990

Table 12.—Saw-log production by Forest Survey Unit, species group, and State of destination, Minnesota, 1990

Table 13.—Saw-log production by Forest Survey Unit, county, and species group, Minnesota, 1990

Table 14.—Saw-log receipts in Minnesota by Forest Survey Unit, species group, and State of origin, 1990

Table 15.—Veneer log production and receipts in Minnesota for selected years, 1960-1990

Table 16.—Veneer log production and receipts by species group in Minnesota, 1988 and 1990

Table 17.—Veneer log and bolt production in Minnesota by species group and destination, 1990

Table 18.—Veneer log receipts in Minnesota by area of origin for selected years, 1960-1990

Table 19.—Veneer log and bolt receipts in Minnesota by species group and area of origin, 1990

Table 20.—Growing-stock removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, Minnesota, 1990

Table 21.—Sawtimber removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, Minnesota, 1990

Table 22.—Harvest residue generated by industrial roundwood harvesting from timberland by Forest Survey Unit, county, and species group, Minnesota, 1990

Table 23.—Residue produced at primary wood-using mills by type of material, type of use, and Survey Unit, Minnesota, 1990

Table 1.--Number of active primary wood-using mills in Minnesota 1975, 1988, and 1990

Kind of mill	1975	1988	1990
Sawmills 1/			
Large 2/	8	14	12
Medium 3/	29	57	52
Small 4/	583	602	457
Total	620	673	521
Pulp mills 5/	9	15	15
Veneer mills	4	4	1
Other mills	17	37	35
Total	650	729	572

1/ Mills persistently sawing 50 mbf or more annually.

2/ Annual lumber production in excess of 5 million board feet.

3/ Annual lumber production from 1 million to 5 million board feet.

4/ Annual lumber production from 50 thousand to 1 million board feet.

5/ Includes flakeboard plants after 1977, formerly reported in "other mills" category.

Table 2.--Industrial roundwood receipts by type of mill in Minnesota 1975, 1988, and 1990

(In million cubic feet)

Kind of mill	1975	1988	1990	% Change
All species				
Pulp mills 1/	83.8	156.4	179.1	+15
Sawmills	30.9	55.7	47.3	-15
Other mills 2/	6.6	6.4	7.9	+23
Total	121.3	218.5	234.3	+7
Softwoods				
Pulp mills 1/	28.8	33.3	41.1	+23
Sawmills	9.7	22.4	14.8	-34
Other mills 2/	0.3	0.9	2.5	+177
Total	38.8	56.6	58.4	+3
Hardwoods				
Pulp mills 1/	55.0	123.1	138.0	+12
Sawmills	21.2	33.3	32.5	-2
Other mills 2/	6.3	5.5	5.4	-2
Total	82.5	161.9	175.9	+9

1/ Includes flakeboard plants after 1978, formerly reported in "other mills" category.

2/ Does not include treating plants or fuelwood receipts.

Table 3.--Industrial roundwood production by Forest Survey Unit, by species group, and type of product, Minnesota, 1990 1/

ALL UNITS

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	*MCF 3/*	*MBF 2/*	*MCF 3/*	*Cords 4/*	*MCF 3/*	*Cords 4/*	*MCF 3/*	*Pieces*	*MCF3/*	*Thou. pieces*	*MCF 3/*	*MCF3/*	*MCF 3/*
SOFTWOODS														
Cedar	1,856	372	--	--	4,377	344	--	--	--	--	216	172	--	888
Balsam fir	3,621	730	--	--	197,339	15,474	--	--	--	--	--	--	159	16,363
Jack pine	21,521	4,346	--	--	114,243	8,998	--	--	2,600	15	7	6	816	14,181
Red pine	33,344	5,747	--	--	18,667	1,474	--	--	59,220	355	375	301	699	8,576
White pine	14,456	2,489	11	2	4,560	356	--	--	--	--	--	--	--	2,847
Spruce	5,299	1,069	--	--	179,656	14,080	--	--	--	--	--	--	--	15,149
Tamarack	263	49	--	--	4,394	348	--	--	--	--	--	--	--	397
Total	80,360	14,802	11	2	523,236	41,074	--	--	61,820	370	598	479	1,674	58,401
HARDWOODS														
Ash	7,608	1,238	1,230	194	105	9	1,950	129	--	--	--	--	--	1,570
Aspen	82,808	14,912	1,945	317	1,658,100	130,512	--	--	--	--	--	--	1,872	147,613
Balsam poplar	201	36	--	--	52,966	4,163	--	--	--	--	--	--	--	4,199
Basswood	14,718	2,405	2,507	406	116	9	--	--	--	--	--	--	--	2,820
White birch	16,929	2,772	8,646	1,405	22,741	1,792	5,750	379	--	--	--	--	--	6,348
Yellow birch	71	11	--	--	--	--	--	--	--	--	--	--	--	11
Cottonwood	3,339	541	240	37	--	--	--	--	--	--	--	--	--	578
Elm	3,118	504	146	22	--	--	300	19	--	--	--	--	--	545
Hickory	230	37	--	--	--	--	--	--	--	--	--	--	--	37
Hard maple	1,247	198	172	29	--	--	500	34	--	--	--	--	--	261
Soft maple	1,578	251	23	3	19,648	1,549	750	49	--	--	--	--	--	1,852
Red oak	42,107	7,770	787	126	--	--	800	52	--	--	--	--	8	7,956
White oak	9,338	1,707	659	101	--	--	300	21	--	--	--	--	164	1,993
Walnut	863	135	309	49	--	--	--	--	--	--	--	--	--	184
Other hardwoods	101	16	7	1	--	--	--	--	--	--	--	--	--	17
Total	184,256	32,533	16,671	2,690	1,753,676	138,034	10,350	683	--	--	--	--	2,044	175,984
All species	264,616	47,335	16,682	2,692	2,276,912	179,108	10,350	683	61,820	370	598	479	3,718	234,385

(Table 3 continued on next page)

(Table 3 continued)

ASPEN-BIRCH UNIT

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	*MCF 3/*	*MBF 2/*	*MCF 3/*	*Cords 4/*	*MCF 3/*	*Cords 4/*	*MCF 3/*	*Pieces*	*MCF3/*	*Thou. pieces*	*MCF 3/*	*MCF3/*	*MCF 3/*
SOFTWOODS														
Cedar	839	170	--	--	3,823	300	--	--	--	--	176	140	--	610
Balsam fir	1,509	304	--	--	116,763	9,155	--	--	--	--	--	--	60	9,519
Jack pine	5,964	1,205	--	--	44,765	3,527	--	--	--	--	--	--	79	4,811
Red pine	11,560	1,994	--	--	9,607	759	--	--	9,900	59	66	53	120	2,985
White pine	8,235	1,420	--	--	3,330	263	--	--	--	--	--	--	--	1,683
Spruce	4,716	953	--	--	136,757	10,722	--	--	--	--	--	--	--	11,675
Tamarack	71	12	--	--	2,804	222	--	--	--	--	--	--	--	234
Total	32,894	6,058	--	--	317,849	24,948	--	--	9,900	59	242	193	259	31,517
HARDWOODS														
Ash	1,193	195	90	14	42	4	850	57	--	--	--	--	--	270
Aspen	28,004	5,046	1,248	204	631,791	49,731	--	--	--	--	--	--	119	55,100
Balsam poplar	100	18	--	--	35,174	2,767	--	--	--	--	--	--	--	2,785
Basswood	799	130	65	11	--	--	--	--	--	--	--	--	--	141
White birch	6,119	1,002	6,917	1,125	20,838	1,644	2,700	177	--	--	--	--	--	3,948
Yellow birch	3	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm	35	5	--	--	--	--	100	6	--	--	--	--	--	11
Hickory	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	81	13	58	10	--	--	100	7	--	--	--	--	--	30
Soft maple	2	--	--	--	8,796	693	500	32	--	--	--	--	--	725
Red oak	243	45	4	1	--	--	350	23	--	--	--	--	--	69
White oak	50	9	--	--	--	--	--	--	--	--	--	--	--	9
Walnut	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	0
Total	36,629	6,463	8,382	1,365	696,641	54,839	4,600	302	--	--	--	--	119	63,088
All species	69,523	12,521	8,382	1,365	1,014,490	79,787	4,600	302	9,900	59	242	193	378	94,605

(Table 3 continued on next page)

(Table 3 continued)

NORTHERN PINE UNIT

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	*MCF 3/*	*MBF 2/*	*MCF 3/*	*Cords 4/*	*MCF 3/*	*Cords 4/*	*MCF 3/*	*Pieces*	*MCF3/*	*Thou. pieces*	*MCF 3/*	*MCF3/*	*MCF 3/*
SOFTWOODS														
Cedar	973	193	--	--	554	44	--	--	--	--	--	--	--	237
Balsam fir	2,104	425	--	--	80,515	6,314	--	--	--	--	--	--	99	6,838
Jack pine	14,825	2,995	--	--	68,428	5,393	--	--	2,600	15	7	6	541	8,950
Red pine	20,478	3,529	--	--	6,439	510	--	--	43,900	263	279	225	541	5,068
White pine	5,618	966	11	2	1,190	91	--	--	--	--	--	--	--	1,059
Spruce	583	116	--	--	42,575	3,333	--	--	--	--	--	--	--	3,449
Tamarack	157	31	--	--	1,590	126	--	--	--	--	--	--	--	157
Total	44,738	8,255	11	2	201,291	15,811	--	--	46,500	278	286	231	1,181	25,758
HARDWOODS														
Ash	4,400	719	736	120	63	5	1,100	72	--	--	--	--	--	916
Aspen	49,752	8,960	590	95	928,411	73,074	--	--	--	--	--	--	922	83,051
Balsam poplar	100	18	--	--	14,098	1,106	--	--	--	--	--	--	--	1,124
Basswood	7,119	1,170	1,365	222	--	--	--	--	--	--	--	--	--	1,392
White birch	10,231	1,678	1,297	210	985	76	3,050	202	--	--	--	--	--	2,166
Yellow birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	27	4	--	--	--	--	--	--	--	--	--	--	--	4
Elm	701	112	5	1	--	--	200	13	--	--	--	--	--	126
Hickory	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	190	30	--	--	--	--	400	27	--	--	--	--	--	57
Soft maple	224	35	1	--	7,285	576	250	17	--	--	--	--	--	628
Red oak	11,814	2,181	51	7	--	--	450	29	--	--	--	--	8	2,225
White oak	1,045	188	81	11	--	--	300	21	--	--	--	--	--	220
Walnut	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	2	--	--	--	--	--	--	--	--	--	--	--	--	0
Total	85,605	15,095	4,126	666	950,842	74,837	5,750	381	--	--	--	--	930	91,909
All species	130,343	23,350	4,137	668	1,152,133	90,648	5,750	381	46,500	278	286	231	2,111	117,667

(Table 3 continued on next page)

(Table 3 continued)

CENTRAL HARDWOOD UNIT

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 2/	*MCF 3/*	*MBF 2/*	*MCF 3/*	*Cords 4/*	*MCF 3/*	*Cords 4/*	*MCF 3/*	*Pieces*	*MCF3/*	*Thou. pieces*	*MCF 3/*	*MCF3/*	*MCF 3/*
SOFTWOODS														
Cedar	39	8	--	--	--	--	--	--	--	--	40	32	--	40
Balsam fir	8	1	--	--	61	5	--	--	--	--	--	--	--	6
Jack pine	725	145	--	--	1,050	78	--	--	--	--	--	--	196	419
Red pine	1,291	222	--	--	2,606	204	--	--	5,420	33	30	23	38	520
White pine	602	103	--	--	40	2	--	--	--	--	--	--	--	105
Spruce	--	--	--	--	324	25	--	--	--	--	--	--	--	25
Tamarack	19	4	--	--	--	--	--	--	--	--	--	--	--	4
Total	2,684	483	--	--	4,081	314	--	--	5,420	33	70	55	234	1,119
HARDWOODS														
Ash	1,567	254	283	41	--	--	--	--	--	--	--	--	--	295
Aspen	4,318	775	107	18	93,888	7,391	--	--	--	--	--	--	831	9,015
Balsam poplar	--	--	--	--	3,694	290	--	--	--	--	--	--	--	290
Basswood	6,020	983	713	114	116	9	--	--	--	--	--	--	--	1,106
White birch	572	91	432	70	918	72	--	--	--	--	--	--	--	233
Yellow birch	68	11	--	--	--	--	--	--	--	--	--	--	--	11
Cottonwood	2,078	337	207	32	--	--	--	--	--	--	--	--	--	369
Elm	1,352	219	14	1	--	--	--	--	--	--	--	--	--	220
Hickory	230	37	--	--	--	--	--	--	--	--	--	--	--	37
Hard maple	843	134	79	13	--	--	--	--	--	--	--	--	--	147
Soft maple	1,028	165	--	--	3,567	280	--	--	--	--	--	--	--	445
Red oak	27,856	5,143	682	112	--	--	--	--	--	--	--	--	--	5,255
White oak	7,597	1,396	497	79	--	--	--	--	--	--	--	--	164	1,639
Walnut	736	116	255	41	--	--	--	--	--	--	--	--	--	157
Other hardwoods	84	13	7	1	--	--	--	--	--	--	--	--	--	14
Total	54,349	9,674	3,276	522	102,183	8,042	--	--	--	--	--	--	995	19,233
All species	57,033	10,157	3,276	522	106,264	8,356	--	--	5,420	33	70	55	1,229	20,352

(Table 3 continued on next page)

(Table 3 continued)

PRAIRIE UNIT

Species group	Saw logs		Veneer logs		Pulpwood		Industrial fuelwood		Poles		Posts		Other products	All products
	MBF 1/	*MCF 2/*	*MBF 1/*	*MCF 2/*	*Cords 3/*	*MCF 2/*	*Cords 3/*	*MCF 2/*	*Pieces*	*MCF 2/*	*Thou. pieces*	*MCF 2/*	*MCF 2/*	*MCF 2/*
SOFTWOODS														
Cedar	5	1	--	--	--	--	--	--	--	--	--	--	--	1
Balsam fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jack pine	7	1	--	--	--	--	--	--	--	--	--	--	--	1
Red pine	15	2	--	--	15	1	--	--	--	--	--	--	--	3
White pine	1	--	--	--	--	--	--	--	--	--	--	--	--	--
Spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tamarack	16	2	--	--	--	--	--	--	--	--	--	--	--	2
Total	44	6	--	--	15	1	--	--	--	--	--	--	--	7
HARDWOODS														
Ash	448	70	121	19	--	--	--	--	--	--	--	--	--	89
Aspen	734	131	--	--	4,010	316	--	--	--	--	--	--	--	447
Balsam poplar	1	--	--	--	--	--	--	--	--	--	--	--	--	--
Basswood	780	122	364	59	--	--	--	--	--	--	--	--	--	181
White birch	7	1	--	--	--	--	--	--	--	--	--	--	--	1
Yellow birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cottonwood	1,234	200	33	5	--	--	--	--	--	--	--	--	--	205
Elm	1,030	168	127	20	--	--	--	--	--	--	--	--	--	188
Hickory	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	133	21	35	6	--	--	--	--	--	--	--	--	--	27
Soft maple	324	51	22	3	--	--	--	--	--	--	--	--	--	54
Red oak	2,194	401	50	6	--	--	--	--	--	--	--	--	--	407
White oak	646	114	81	11	--	--	--	--	--	--	--	--	--	125
Walnut	127	19	54	8	--	--	--	--	--	--	--	--	--	27
Other hardwoods	15	3	--	--	--	--	--	--	--	--	--	--	--	3
Total	7,673	1,301	887	137	4,010	316	--	--	--	--	--	--	--	1,754
All species	7,717	1,307	887	137	4,025	317	--	--	--	--	--	--	--	1,761

1/ Factors for determining thousand cubic feet (MCF) are based on Minnesota Utilization Study, 1990

2/ Thousand board feet, International 1/4-inch rule.

3/ Thousand cubic feet.

4/ Standard cords are 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

Table 4.-- Material harvested on timberland for industrial roundwood production by source of material and species group, Minnesota, 1990 1/

(In thousand cubic feet)

Species group	Growing stock				Nongrowing stock						Total material used for products	Total material not used	Total material harvested
	Used for products				Used for products								
	Saw-timber	Pole-timber	Residue	TOTAL	Limb-wood	Sap-lings	Cull trees	Dead trees	Not used	TOTAL			
SOFTWOODS													
Cedar	576	254	39	869	17	5	26	10	328	386	888	367	1,255
Balsam fir	10,384	5,398	403	16,185	562	--	8	11	6,763	7,344	16,363	7,166	23,529
Jack pine	10,398	2,769	656	13,823	342	--	350	322	5,604	6,618	14,181	6,260	20,441
Red pine	7,567	729	387	8,683	92	10	127	51	2,998	3,278	8,576	3,385	11,961
White pine	2,694	86	76	2,856	32	--	26	9	1,107	1,174	2,847	1,183	4,030
Spruce	9,728	4,877	375	14,980	516	--	11	17	6,359	6,903	15,149	6,734	21,883
Tamarack	264	121	9	394	12	--	--	--	166	178	397	175	572
Total	41,611	14,234	1,945	57,790	1,573	15	548	420	23,325	25,881	58,401	25,270	83,671
HARDWOODS													
Ash	1,304	157	314	1,775	48	--	61	--	600	709	1,570	914	2,484
Aspen	101,285	39,930	8,389	149,604	1,861	60	4,428	49	57,026	63,424	147,613	65,415	213,028
Balsam poplar	2,917	1,110	223	4,250	37	--	135	--	1,660	1,832	4,199	1,883	6,082
Basswood	2,497	204	610	3,311	11	--	108	--	1,167	1,286	2,820	1,777	4,597
White birch	4,459	1,347	928	6,734	195	--	347	--	2,352	2,894	6,348	3,280	9,628
Yellow birch	10	1	1	12	--	--	--	--	5	5	11	6	17
Cottonwood	516	44	127	687	1	--	17	--	242	260	578	369	947
Elm	481	42	118	641	6	--	16	--	221	243	545	339	884
Hickory	33	3	7	43	--	--	1	--	15	16	37	22	59
Hard maple	210	29	49	288	10	--	12	--	94	116	261	143	404
Soft maple	566	1,000	73	1,639	170	50	50	16	279	565	1,852	352	2,204
Red oak	5,387	59	1,707	7,153	153	--	2,328	29	5,156	7,666	7,956	6,863	14,819
White oak	1,401	14	410	1,825	42	--	532	4	1,184	1,762	1,993	1,594	3,587
Walnut	168	10	38	216	--	--	6	--	74	80	184	112	296
Other hardwoods	16	1	1	18	--	--	--	--	6	6	17	7	24
Total	121,250	43,951	12,995	178,196	2,534	110	8,041	98	70,081	80,864	175,984	83,076	259,060
All species	162,861	58,185	14,940	235,986	4,107	125	8,589	518	93,406	106,745	234,385	108,346	342,731

1/ Factors for determining the amount of wood in each category are based on the Minnesota Utilization Study, 1990

Table 5.--Minnesota pulpwood production by species group, 1946-1990

(In thousand standard cords, unpeeled) 1/

Year	Roundwood									Residue	
	Total	Pine	Balsam fir	Cedar	Spruce	Tamarack	Aspen	Other Birch	hardwoods	Soft-woods	Hard-woods
1946	977	333	93	--	258	19	265	1	--	3	5
1947	852	266	119	--	225	18	221	0	--	1	2
1948	988	286	150	--	269	5	276	2	--	--	--
1949	606	163	117	--	190	3	133	0	--	--	--
1950	748	187	126	--	185	1	248	0	1	--	--
1951	1,077	340	153	--	280	18	283	1	2	--	--
1952	937	194	163	--	293	13	270	2	2	--	--
1953	813	218	101	--	215	6	268	1	4	--	--
1954	837	214	118	--	237	7	254	1	6	--	--
1955	886	218	120	--	265	8	266	4	5	--	--
1956	1,067	259	140	--	287	14	353	5	9	--	--
1957	1,049	223	173	--	345	18	277	7	6	--	--
1958	903	198	116	--	241	14	324	2	8	--	--
1959	994	239	130	--	220	11	381	1	12	--	--
1960	1,048	225	145	--	256	19	392	1	10	--	--
1961	968	206	111	--	240	8	368	1	34	--	--
1962	979	201	110	--	217	9	406	2	34	--	--
1963	1,063	208	102	--	255	13	433	--	51	--	1
1964	1,063	204	90	--	256	12	451	--	45	--	5
1965	1,018	181	74	--	237	12	468	--	41	1	4
1966	1,174	256	80	--	172	7	612	1	31	2	13
1967	1,205	202	76	--	218	40	591	3	39	7	29
1968	1,087	203	43	--	157	26	583	1	22	16	36
1969	1,192	237	40	--	154	21	660	3	32	5	40
1970	1,224	221	45	--	181	36	600	31	27	17	66
1971	1,196	214	40	--	168	32	607	34	31	22	48
1972	1,354	216	66	--	192	31	689	42	30	25	63
1973	1,377	205	66	--	215	32	673	42	36	26	82
1974	1,578	239	92	--	207	43	804	44	37	35	77
1975	1,359	199	121	--	202	56	616	35	22	44	64
1976	1,309	172	74	--	176	37	673	46	32	33	66
1977	1,333	174	99	--	153	42	697	30	25	35	78
1978	1,338	186	96	--	164	31	704	9	39	35	74
1979 2/	1,458	158	117	--	153	36	838	7	31	43	75
1980	1,333	150	111	--	170	43	699	15	48	34	63
1981	1,370	147	101	--	127	30	801	11	53	39	61
1982	1,484	179	106	--	133	45	866	3	59	49	44
1983	1,910	140	90	--	95	26	1,392	4	69	55	39
1984	2,151	189	146	--	118	12	1,529	3	62	47	45
1985	1,880	137	122	--	111	9	1,361	2	48	47	43
1986	1,979	139	101	--	98	13	1,469	10	46	46	57
1987	2,078	111	112	--	101	8	1,578	13	41	54	60
1988	2,131	121	170	--	146	11	1,501	13	55	57	57
1989	2,264	132	198	--	163	5	1,610	23	54	29	50
1990	2,359	137	197	4	180	4	1,658	23	73	27	56

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Pulpwood includes logs, bolts, and wood residue used in manufacturing particleboard and waferboard after 1978.

Table 6.-- Minnesota pulpwood production by species group and destination, 1990

(In thousand standard cords, unpeeled) 1/

Class of material and species group	Total	Michigan	Minnesota	Wisconsin	Canada
ROUNDWOOD					
SOFTWOODS					
Cedar	4	--	4	--	--
Balsam fir	197	--	189	--	8
Jack pine	115	--	102	7	6
Red pine	19	--	15	4	--
White pine	5	--	5	--	--
Spruce	179	--	123	46	10
Tamarack	4	--	2	2	--
Total	523	--	436	59	24
HARDWOODS					
Ash	(2/)	(2/)	--	--	--
Aspen	1,658	--	1,611	40	7
Balsam poplar	53	--	53	--	--
White birch	23	1	1	21	--
Soft maple	20	--	16	4	--
Total	1,754	1	1,681	65	7
Total roundwood	2,277	1	2,117	124	31
RESIDUES 3/					
Softwood	27	--	24	2	1
Hardwood	56	--	56	--	--
Total	83	--	80	2	1
ALL MATERIAL	2,360	1	2,197	126	32

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Less than 500 cords.

3/ Chippable mill residues such as slabs, edgings, etc. Roundwood chips are included in roundwood.

Table 7.-- Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Minnesota, 1990

(In standard cords)

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tama-rack	Ash	Aspen	Balsam poplar	Bass-wood	White birch	Soft maple	All species
ASPEN-BIRCH UNIT														
Carlton	--	12,593	1,228	1,015	20	1,890	21	--	25,048	3,085	--	5,202	2,525	52,627
Cook	--	7,787	104	34	--	19,345	--	--	24,776	24	--	--	--	52,070
Koochiching	1,325	29,646	7,261	1,270	310	57,353	1,749	21	173,873	11,277	--	24	--	284,109
Lake	--	10,964	7,315	520	36	17,248	224	--	68,271	930	--	10,596	20	116,124
St. Louis	2,498	55,773	28,857	6,768	2,964	40,921	810	21	339,823	19,858	--	5,016	6,251	509,560
Total	3,823	116,763	44,765	9,607	3,330	136,757	2,804	42	631,791	35,174	--	20,838	8,796	1,014,490
NORTHERN PINE UNIT														
Aitkin	--	5,257	322	201	4	1,399	24	--	77,813	7,453	--	13	3,614	96,100
Becker	--	1,136	295	90	4	127	--	--	52,042	167	--	--	--	53,861
Beltrami	--	12,408	8,390	1,007	191	7,659	1,259	--	132,501	401	--	--	--	163,816
Cass	--	7,346	7,257	1,303	225	1,516	37	--	152,449	909	--	--	--	171,042
Clearwater	--	2,114	537	168	5	2,251	55	--	71,165	167	--	--	--	76,462
Crow Wing	--	683	3,177	726	--	186	12	--	53,270	283	--	--	--	58,337
Hubbard	--	470	4,995	702	29	310	--	--	41,062	1,200	--	313	--	49,081
Itasca	554	48,785	5,922	1,612	531	19,412	139	63	295,722	2,974	--	659	3,671	380,044
Lake of the Woods	--	2,118	18,875	316	196	9,080	7	--	20,779	269	--	--	--	51,640
Mahnomen	--	--	--	--	--	--	--	--	7,448	--	--	--	--	7,448
Roseau	--	64	15,337	41	--	635	57	--	9,774	165	--	--	--	26,073
Wadena	--	134	3,321	273	5	--	--	--	14,386	110	--	--	--	18,229
Total	554	80,515	68,428	6,439	1,190	42,575	1,590	63	928,411	14,098	--	985	7,285	1,152,133
CENTRAL HARDWOOD UNIT														
Kanabec	--	--	--	--	--	--	--	--	3,187	--	--	--	--	3,187
Mille Lacs	--	--	65	16	--	--	--	--	32,841	34	--	--	--	32,956
Morrison	--	--	65	16	--	--	--	--	4,928	7	--	--	--	5,016
Pine	--	61	816	737	16	309	--	--	52,223	3,646	116	918	3,567	62,409
Sherburne	--	--	39	1,821	24	15	--	--	--	--	--	--	--	1,899
Todd	--	--	65	16	--	--	--	--	709	7	--	--	--	797
Total	--	61	1,050	2,606	40	324	--	--	93,888	3,694	116	918	3,567	106,264
PRAIRIE UNIT														
Lincoln	--	--	--	15	--	--	--	--	--	--	--	--	--	15
Pennington	--	--	--	--	--	--	--	--	469	--	--	--	--	469
Polk	--	--	--	--	--	--	--	--	2,135	--	--	--	--	2,135
Red Lake	--	--	--	--	--	--	--	--	1,406	--	--	--	--	1,406
Total	--	--	--	15	--	--	--	--	4,010	--	--	--	--	4,025
STATE TOTAL	4,377	197,339	114,243	18,667	4,560	179,656	4,394	105	1,658,100	52,966	116	22,741	19,648	2,276,912

Table 8.--Pulpwood receipts in Minnesota by species group, 1946-1990

(In thousand standard cords, unpeeled) 1/

Year	Roundwood									Residue	
	Total	Pine	Balsam fir	Cedar	Spruce	Tamarack	Aspen	Birch	Other hardwoods	Soft-woods	Hard-woods
1946	599	175	62	--	141	6	207	--	--	3	5
1947	497	160	48	--	122	6	158	--	--	1	2
1948	726	187	77	--	195	3	264	--	--	--	--
1949	418	111	48	--	114	1	144	--	--	--	--
1950	595	177	41	--	108	1	267	--	1	--	--
1951	823	241	74	--	202	9	296	--	1	--	--
1952	720	154	62	--	191	9	302	--	2	--	--
1953	662	165	42	--	153	6	292	--	4	--	--
1954	687	163	52	--	171	6	289	--	6	--	--
1955	723	177	58	--	176	7	298	2	5	--	--
1956	835	204	69	--	176	9	365	3	9	--	--
1957	753	156	74	--	210	10	292	5	6	--	--
1958	699	161	55	--	133	3	338	2	7	--	--
1959	813	195	69	--	128	3	405	1	12	--	--
1960	787	164	85	--	116	3	408	1	10	--	--
1961	784	187	67	--	120	--	375	1	34	--	--
1962	828	189	75	--	111	--	418	1	34	--	--
1963	921	190	77	--	157	--	446	--	50	--	1
1964	938	213	68	--	153	--	455	--	43	--	6
1965	912	205	60	--	138	--	462	--	39	--	8
1966	1,063	207	60	--	155	--	588	1	31	--	21
1967	958	179	49	--	115	2	551	1	25	5	31
1968	993	206	33	--	92	--	576	--	27	13	46
1969	1,082	231	33	--	84	--	633	3	40	7	51
1970	1,058	188	42	--	111	--	557	31	33	22	74
1971	1,063	154	40	--	116	--	585	34	38	32	64
1972	1,224	166	65	--	128	4	686	41	36	23	75
1973	1,223	156	60	--	142	7	618	41	38	51	110
1974	1,392	193	84	--	142	10	718	37	40	73	95
1975	1,227	169	116	--	163	32	560	33	21	51	82
1976	1,177	134	68	--	142	7	599	43	31	62	91
1977	1,210	143	94	--	125	16	624	27	24	55	102
1978	1,218	151	90	--	136	10	647	3	31	60	90
1979 2/	1,294	130	109	--	131	18	733	3	28	66	76
1980	1,097	106	80	--	128	14	613	--	47	51	58
1981	1,164	116	71	--	95	5	725	1	52	37	62
1982	1,299	154	93	--	103	18	785	--	56	45	45
1983	1,782	137	87	--	78	8	1,313	1	69	48	41
1984	1,962	179	126	--	83	2	1,421	--	62	40	49
1985	1,775	135	106	--	77	7	1,320	--	49	39	42
1986	1,930	140	97	--	73	11	1,455	1	48	47	58
1987	2,029	107	108	--	75	8	1,578	1	43	52	57
1988	2,083	118	184	--	109	10	1,496	1	59	53	53
1989	2,201	119	206	--	124	4	1,595	--	55	52	46
1990	2,287	137	203	4	133	2	1,639	1	77	31	60

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Pulpwood includes logs, bolts, and wood residue used in manufacturing particleboard and waferboard after 1978.

Table 9.--Pulpwood receipts in Minnesota by area of origin, 1960-1990

(In thousand standard cords, unpeeled) 1/

Year	All areas	Area of origin				
		Michigan	Wisconsin	Minnesota	Other States	Canada
1960	702	--	19	626	--	57
1961	793	--	14	721	--	58
1962	786	--	15	711	--	60
1963	805	--	20	712	--	73
1964	835	--	19	753	--	63
1965	898	--	8	828	1	61
1966	1,140	1	13	970	77	79
1967	958	--	15	884	1	58
1968	992	--	22	900	1	69
1969	1,082	--	17	977	2	86
1970	1,058	--	11	981	1	65
1971	1,064	--	35	992	1	36
1972	1,224	--	28	1,168	2	26
1973	1,222	--	14	1,152	29	27
1974	1,392	--	14	1,297	16	65
1975	1,226	--	20	1,173	18	15
1976	1,177	--	23	1,109	26	19
1977	1,209	--	26	1,149	19	15
1978	1,218	--	26	1,155	20	17
1979 2/	1,295	--	21	1,226	29	19
1980	1,097	--	18	1,044	20	15
1981	1,164	--	34	1,119	--	11
1982	1,298	--	26	1,264	--	8
1983	1,782	--	53	1,720	--	9
1984	1,961	--	65	1,888	--	8
1985	1,775	--	59	1,714	--	2
1986	1,930	--	56	1,873	--	1
1987	2,029	--	62	1,967	--	--
1988	2,083	--	80	2,002	--	1
1989	2,201	2	89	2,110	--	--
1990	2,287	2	83	2,200	--	2

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Pulpwood includes logs, bolts, and wood residue used in manufacturing particleboard and waferboard after 1978.

Table 10.-- Minnesota pulpwood receipts by species group and area of origin, 1990

(In thousand standard cords, unpeeled) 1/

Class of material and species group	Total	Minnesota	Wisconsin	Canada
ROUNDWOOD				
SOFTWOODS				
Cedar	4	4	--	--
Balsam fir	203	189	14	--
Jack pine	110	102	8	--
Red pine	22	15	7	--
White pine	5	5	(2/)	--
Spruce	132	123	9	--
Tamarack	2	2	--	--
Total	478	440	38	--
HARDWOODS				
Ash	(2/)	(2/)	--	--
Aspen	1,639	1,611	26	2
Balsam poplar	56	53	3	--
White birch	1	1	--	--
Soft maple	21	16	5	--
Red oak	--	--	--	--
Total	1,717	1,681	34	2
All species	2,195	2,121	72	2
RESIDUES 3/				
Softwood	32	25	7	--
Hardwood	60	56	4	--
Total	92	81	11	--
ALL MATERIAL	2,287	2,202	83	2

1/ 128 cubic feet consisting of 79 cubic feet of wood and 49 cubic feet of bark and air space.

2/ Less than 500 cords.

3/ Chippable mill residues such as slabs, edgings, etc. Roundwood chips are included in roundwood.

Table 11.--Saw log production and receipts in Minnesota by species group, 1988 and 1990

(In thousand board feet) 1/

Species group	Production			Receipts		
	1988	1990	Change	1988	1990	Change
SOFTWOODS						
Cedar	2,260	1,856	-404	2,260	1,819	-441
Balsam fir	4,186	3,621	-565	3,895	3,517	-378
Jack pine	34,950	21,521	-13,429	38,385	21,612	-16,773
Red pine	42,863	33,344	-9,519	49,569	34,127	-15,442
White pine	20,096	14,456	-5,640	21,011	15,296	-5,715
Spruce	7,470	5,299	-2,171	5,584	4,959	-625
Tamarack	253	263	10	253	263	10
Total	112,078	80,360	-31,718	120,957	81,593	-39,364
HARDWOODS						
Ash	9,502	7,608	-1,894	9,493	7,508	-1,985
Aspen	82,496	82,808	312	82,530	82,855	325
Balsam poplar	450	201	-249	450	201	-249
Basswood	14,339	14,718	379	13,436	13,125	-311
White birch	13,152	16,929	3,777	13,129	16,931	3,802
Yellow birch	304	71	-233	341	43	-298
Cottonwood	3,998	3,339	-659	3,055	2,617	-438
Elm	8,120	3,118	-5,002	8,120	3,114	-5,006
Hickory	151	230	79	63	240	177
Hard maple	1,630	1,247	-383	1,578	941	-637
Soft maple	2,383	1,578	-805	2,192	1,077	-1,115
Red oak	47,134	42,107	-5,027	42,004	38,474	-3,530
White oak	10,121	9,338	-783	7,431	8,493	1,062
Walnut	736	863	127	682	396	-286
Other hardwoods	561	101	-460	547	35	-512
Total	195,077	184,256	-10,821	185,051	176,050	-9,001
All species	307,155	264,616	-42,539	306,008	257,643	-48,365

1/ International 1/4-inch rule.

Table 12.--Saw log production by Forest Survey Unit, species group, and State of destination, Minnesota, 1990

(Thousand board feet) 1/

Species group	ALL UNITS				
	Total	Minnesota	Wisconsin	Iowa	Other States
SOFTWOODS					
Cedar	1,856	1,819	37	--	--
Balsam fir	3,621	3,517	--	--	104
Jack pine	21,521	20,684	--	--	837
Red pine	33,344	32,907	62	--	375
White pine	14,456	14,456	--	--	--
Spruce	5,299	4,949	--	--	350
Tamarack	263	263	--	--	--
Total	80,360	78,595	99	--	1,666
HARDWOODS					
Ash	7,608	7,478	130	--	--
Aspen	82,808	82,753	55	--	--
Balsam poplar	201	201	--	--	--
Basswood	14,718	12,997	537	1,094	90
White birch	16,929	16,928	--	--	1
Yellow birch	71	31	40	--	--
Cottonwood	3,339	2,617	21	701	--
Elm	3,118	3,047	71	--	--
Hickory	230	191	39	--	--
Hard maple	1,247	913	327	--	7
Soft maple	1,578	1,062	299	215	2
Red oak	42,107	37,372	4,605	130	--
White oak	9,338	8,128	885	325	--
Walnut	863	384	38	441	--
Other hardwoods	101	35	56	10	--
Total	184,256	174,137	7,103	2,916	100
All species	264,616	252,732	7,202	2,916	1,766

(Table 12 continued on next page)

(Table 12 continued)

Species group	Total	Minnesota	Wisconsin	Iowa	Other States
ASPEN-BIRCH UNIT					
SOFTWOODS					
Cedar	839	839	--	--	--
Balsam fir	1,509	1,405	--	--	104
Jack pine	5,964	5,127	--	--	837
Red pine	11,560	11,185	--	--	375
White pine	8,235	8,235	--	--	--
Spruce	4,716	4,366	--	--	350
Tamarack	71	71	--	--	--
Total	32,894	31,228	--	--	1,666
HARDWOODS					
Ash	1,193	1,193	--	--	--
Aspen	28,004	28,004	--	--	--
Balsam poplar	100	100	--	--	--
Basswood	799	709	--	--	90
White birch	6,119	6,118	--	--	1
Yellow birch	3	3	--	--	--
Elm	35	35	--	--	--
Hard maple	81	74	--	--	7
Soft maple	2	--	--	--	2
Red oak	243	243	--	--	--
White oak	50	50	--	--	--
Walnut	--	--	--	--	--
Other hardwoods	--	--	--	--	--
Total	36,629	36,529	--	--	100
All species	69,523	67,757	--	--	1,766
NORTHERN PINE UNIT					
SOFTWOODS					
Cedar	973	973	--	--	--
Balsam fir	2,104	2,104	--	--	--
Jack pine	14,825	14,825	--	--	--
Red pine	20,478	20,478	--	--	--
White pine	5,618	5,618	--	--	--
Spruce	583	583	--	--	--
Tamarack	157	157	--	--	--
Total	44,738	44,738	--	--	--
HARDWOODS					
Ash	4,400	4,400	--	--	--
Aspen	49,752	49,752	--	--	--
Balsam poplar	100	100	--	--	--
Basswood	7,119	7,119	--	--	--
White birch	10,231	10,231	--	--	--
Yellow birch	--	--	--	--	--
Cottonwood	27	27	--	--	--
Elm	701	701	--	--	--
Hard maple	190	190	--	--	--
Soft maple	224	224	--	--	--
Red oak	11,814	11,814	--	--	--
White oak	1,045	1,045	--	--	--
Walnut	--	--	--	--	--
Other hardwoods	2	2	--	--	--
Total	85,605	85,605	--	--	--
All species	130,343	130,343	--	--	--

(Table 12 continued on next page)

(Table 12 continued)

CENTRAL HARDWOOD UNIT

Species group	Total	Minnesota	Wisconsin	Iowa	Other States
SOFTWOODS					
Cedar	39	2	37	--	--
Balsam fir	8	8	--	--	--
Jack pine	725	725	--	--	--
Red pine	1,291	1,229	62	--	--
White pine	602	602	--	--	--
Tamarack	19	19	--	--	--
Total	2,684	2,585	99	--	--
HARDWOODS					
Ash	1,567	1,437	130	--	--
Aspen	4,318	4,263	55	--	--
Balsam poplar	--	--	--	--	--
Basswood	6,020	4,389	537	1,094	--
White birch	572	572	--	--	--
Yellow birch	68	28	40	--	--
Cottonwood	2,078	1,453	21	604	--
Elm	1,352	1,281	71	--	--
Hickory	230	191	39	--	--
Hard maple	843	516	327	--	--
Soft maple	1,028	514	299	215	--
Red oak	27,856	23,121	4,605	130	--
White oak	7,597	6,387	885	325	--
Walnut	736	257	38	441	--
Other hardwoods	84	28	56	--	--
Total	54,349	44,437	7,103	2,809	--
All species	57,033	47,022	7,202	2,809	--
			PRAIRIE UNIT		
SOFTWOODS					
Cedar	5	5	--	--	--
Jack pine	7	7	--	--	--
Red pine	15	15	--	--	--
White pine	1	1	--	--	--
Tamarack	16	16	--	--	--
Total	44	44	--	--	--
HARDWOODS					
Ash	448	448	--	--	--
Aspen	734	734	--	--	--
Balsam poplar	1	1	--	--	--
Basswood	780	780	--	--	--
White birch	7	7	--	--	--
Yellow birch	--	--	--	--	--
Cottonwood	1,234	1,137	--	97	--
Elm	1,030	1,030	--	--	--
Hickory	--	--	--	--	--
Hard maple	133	133	--	--	--
Soft maple	324	324	--	--	--
Red oak	2,194	2,194	--	--	--
White oak	646	646	--	--	--
Walnut	127	127	--	--	--
Other hardwoods	15	5	--	10	--
Total	7,673	7,566	--	107	--
All species	7,717	7,610	--	107	--

1/ International 1/4-inch rule.

Table 13.-- Saw-log production by Forest Survey Unit, county, and species group, Minnesota, 1990

(In thousand board feet) 1/

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tamarack	Ash	Aspen	Balsam poplar	Basswood	White birch
ASPEN-BIRCH UNIT												
Carlton	--	2	222	271	328	27	5	179	884	--	131	346
Cook	--	223	534	829	851	2,310	27	--	2,879	--	--	1,132
Koochiching	565	785	748	1,806	654	1,224	14	642	20,366	6	451	598
Lake	15	42	929	2,432	2,470	607	--	24	388	--	--	2,351
St. Louis	259	457	3,531	6,222	3,932	548	25	348	3,487	94	217	1,692
Total	839	1,509	5,964	11,560	8,235	4,716	71	1,193	28,004	100	799	6,119
NORTHERN PINE UNIT												
Aitkin	1	49	258	440	224	11	5	918	3,694	31	955	711
Becker	--	--	685	671	429	--	--	119	740	--	713	118
Beltrami	453	20	2,013	2,323	606	220	23	1,351	6,474	30	1,210	2,549
Cass	30	390	4,088	5,409	1,108	--	--	287	9,259	--	573	1,738
Clearwater	--	10	204	163	120	25	15	268	4,864	5	113	109
Crow Wing	--	15	424	906	113	--	33	90	2,699	--	125	179
Hubbard	1	6	1,988	2,120	596	14	3	33	1,548	--	140	715
Itasca	373	1,614	3,115	7,770	2,367	234	--	1,258	17,366	31	3,025	3,962
Lake of the Woods	115	--	877	263	--	65	50	19	1,667	--	1	36
Mahnomen	--	--	42	19	12	2	--	15	687	3	264	2
Roseau	--	--	854	140	--	12	28	4	144	--	--	2
Wadena	--	--	277	254	43	--	--	38	610	--	--	110
Total	973	2,104	14,825	20,478	5,618	583	157	4,400	49,752	100	7,119	10,231
CENTRAL HARDWOOD UNIT												
Anoka	--	--	--	6	5	--	--	--	12	--	4	--
Benton	--	--	--	22	--	--	--	2	56	--	43	3
Carver	--	--	--	--	--	--	--	--	4	--	1	--
Chisago	--	--	--	4	1	--	--	115	36	--	294	--
Dakota	--	--	--	--	--	--	--	--	--	--	--	--
Douglas	--	--	--	6	--	--	--	26	10	--	130	10
Fillmore	--	--	--	--	--	--	--	71	73	--	593	1
Goodhue	--	--	--	--	--	--	--	29	51	--	620	--
Hennepin	--	--	--	--	--	--	--	--	29	--	4	--
Houston	--	--	--	--	--	--	--	125	232	--	827	5
Isanti	--	--	100	204	121	--	--	8	11	--	4	--
Kanabec	--	--	173	295	117	--	--	126	751	--	432	149
Le Sueur	--	--	--	--	--	--	--	20	--	--	1	--
Mille Lacs	--	--	--	9	6	--	--	28	504	--	295	33
Morrison	--	--	15	103	13	--	--	23	266	--	146	14
Olmstead	--	--	--	--	--	--	--	32	15	--	200	--
Otter Tail	--	--	--	6	41	--	12	82	99	--	173	9
Pine	37	8	423	618	292	--	4	507	1,980	--	480	293
Rice	2	--	--	--	--	--	--	84	36	--	343	--
Scott	--	--	--	--	--	--	--	--	5	--	--	--
Sherburne	--	--	--	2	3	--	--	--	1	--	--	--
Stearns	--	--	--	2	--	--	--	102	15	--	242	--
Todd	--	--	14	12	2	--	3	55	18	--	56	51
Wabasha	--	--	--	--	--	--	--	45	37	--	443	--
Washington	--	--	--	--	--	--	--	--	7	--	--	--
Winona	--	--	--	2	--	--	--	76	70	--	661	4
Wright	--	--	--	--	1	--	--	11	--	--	28	--
Total	39	8	725	1,291	602	--	19	1,567	4,318	--	6,020	572

(Table 13 continued on next page)

(Table 13 continued)

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tamarack	Ash	Aspen	Balsam poplar	Basswood	White birch
PRAIRIE UNIT												
Blue Earth	--	--	--	--	--	--	--	4	--	--	6	--
Clay	--	--	2	2	--	--	--	8	7	--	33	5
Dodge	--	--	--	--	--	--	--	6	12	--	62	--
Faribault	--	--	--	--	--	--	--	--	--	--	--	--
Freeborn	--	--	--	--	--	--	--	30	--	--	--	--
Grant	--	--	--	--	--	--	--	--	--	--	--	--
Jackson	--	--	--	--	--	--	--	1	--	--	--	--
Kandiyohi	--	--	--	--	--	--	--	44	--	--	31	--
Kittson	--	--	--	--	--	--	--	32	--	--	50	--
Lyon	--	--	--	--	--	--	--	--	--	--	--	--
Mcleod	--	--	--	--	--	--	--	47	10	--	64	--
Marshall	--	--	4	--	--	--	8	1	13	--	--	1
Meeker	--	--	--	--	--	--	--	45	2	--	33	--
Mower	--	--	--	3	--	--	--	--	--	--	--	--
Murray	--	--	--	--	--	--	--	--	--	--	--	--
Nicollet	--	--	--	--	--	--	--	3	--	--	9	--
Nobles	--	--	--	--	--	--	--	4	--	--	--	--
Norman	--	--	--	--	--	--	--	57	--	--	85	--
Pipestone	--	--	--	8	--	--	--	4	--	--	--	--
Polk	5	--	1	2	1	--	8	70	686	1	50	1
Pope	--	--	--	--	--	--	--	34	2	--	37	--
Red Lake	--	--	--	--	--	--	--	2	--	--	--	--
Sibley	--	--	--	--	--	--	--	54	--	--	300	--
Steele	--	--	--	--	--	--	--	1	2	--	20	--
Stevens	--	--	--	--	--	--	--	1	--	--	--	--
Swift	--	--	--	--	--	--	--	--	--	--	--	--
Waseca	--	--	--	--	--	--	--	--	--	--	--	--
Total	5	--	7	15	1	--	16	448	734	1	780	7
STATE TOTAL	1,856	3,621	21,521	33,344	14,456	5,299	263	7,608	82,808	201	14,718	16,929

(Table 13 continued on next page)

(Table 13 continued)

Unit and county	Yellow birch	Cotton-wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Walnut	O. hard-woods	All species
ASPEN-BIRCH UNIT											
Carlton	–	–	–	–	81	2	173	–	–	–	2,651
Cook	–	–	–	–	–	–	–	–	–	–	8,785
Koochiching	–	–	35	–	–	–	30	50	–	–	27,974
Lake	–	–	–	–	–	–	–	–	–	–	9,258
St. Louis	3	–	–	–	–	–	40	–	–	–	20,855
Total	3	–	35	–	81	2	243	50	–	–	69,523
NORTHERN PINE UNIT											
Aitkin	–	3	27	–	115	2	2,283	129	–	2	9,858
Becker	–	2	75	–	10	34	673	197	–	–	4,466
Beltrami	–	–	295	–	–	108	147	139	–	–	17,961
Cass	–	–	50	–	35	79	4,246	220	–	–	27,512
Clearwater	–	4	147	–	–	–	202	100	–	–	6,349
Crow Wing	–	5	1	–	29	1	2,250	92	–	–	6,962
Hubbard	–	–	64	–	1	–	54	36	–	–	7,319
Itasca	–	–	20	–	–	–	1,695	94	–	–	42,924
Lake of the Woods	–	–	5	–	–	–	3	–	–	–	3,101
Mahnomen	–	–	–	–	–	–	34	–	–	–	1,080
Roseau	–	13	17	–	–	–	–	38	–	–	1,252
Wadena	–	–	–	–	–	–	227	–	–	–	1,559
Total	–	27	701	–	190	224	11,814	1,045	–	2	130,343
CENTRAL HARDWOOD UNIT											
Anoka	–	–	12	–	–	–	107	16	1	1	164
Benton	–	4	18	–	1	1	69	27	–	–	246
Carver	–	2	12	–	–	1	16	1	–	–	37
Chisago	–	–	1	–	19	48	279	216	–	–	1,013
Dakota	–	–	14	–	–	–	11	2	–	–	27
Douglas	–	10	25	–	20	15	297	38	10	–	597
Fillmore	12	130	165	50	37	78	3,883	1,328	173	6	6,600
Goodhue	–	141	144	12	113	85	1,439	577	44	–	3,255
Hennepin	–	2	13	–	–	6	11	4	–	–	69
Houston	16	264	134	114	85	138	5,524	1,422	183	11	9,080
Isanti	–	–	2	–	1	–	33	7	–	–	491
Kanabec	–	–	35	–	62	50	1,870	294	–	–	4,354
Le Sueur	–	366	7	–	1	–	25	41	–	–	461
Mille Lacs	–	9	28	–	14	4	492	184	–	–	1,606
Morrison	–	7	32	–	9	3	312	111	–	–	1,054
Olmstead	–	75	35	1	–	27	696	303	10	8	1,402
Otter Tail	–	8	62	–	2	15	722	112	–	–	1,343
Pine	40	1	23	1	122	150	852	52	–	38	5,921
Rice	–	522	116	2	36	71	1,030	428	83	–	2,753
Scott	–	6	6	–	–	1	12	3	–	–	33
Sherburne	–	–	1	–	–	–	41	1	–	–	49
Stearns	–	19	82	–	30	53	376	225	7	–	1,153
Todd	–	2	32	–	–	1	152	46	–	–	444
Wabasha	–	299	142	18	128	129	4,138	991	93	9	6,472
Washington	–	–	7	–	–	–	8	3	–	–	25
Winona	–	201	157	32	163	135	5,396	1,143	132	11	8,183
Wright	–	10	47	–	–	17	65	22	–	–	201
Total	68	2,078	1,352	230	843	1,028	27,856	7,597	736	84	57,033

(Table 13 continued on next page)

(Table 13 continued)

Unit and county	Yellow birch	Cotton-wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Walnut	O. hard-woods	All species
PRAIRIE UNIT											
Blue Earth	--	55	8	--	--	5	7	8	5	--	98
Clay	--	35	20	--	--	10	33	2	--	--	157
Dodge	--	14	13	--	--	12	302	180	6	--	607
Faribault	--	56	6	--	--	--	1	--	8	--	71
Freeborn	--	156	4	--	--	--	40	60	--	--	290
Grant	--	1	2	--	--	--	--	--	--	--	3
Jackson	--	6	--	--	--	1	1	--	1	--	10
Kandiyohi	--	19	11	--	7	--	30	49	8	--	199
Kittson	--	5	326	--	40	--	350	57	--	5	865
Lyon	--	38	4	--	--	--	--	--	--	5	47
Mcleod	--	20	18	--	8	26	13	35	--	--	241
Marshall	--	5	191	--	--	--	350	--	--	--	573
Meeker	--	26	25	--	7	--	32	45	8	--	223
Mower	--	6	4	--	--	--	27	30	--	--	70
Murray	--	40	10	--	--	--	--	--	--	--	50
Nicollet	--	296	5	--	10	29	89	55	74	--	570
Nobles	--	22	2	--	--	4	4	--	4	--	40
Norman	--	128	26	--	--	55	117	4	--	--	472
Pipestone	--	--	--	--	--	--	8	--	--	--	20
Polk	--	216	307	--	--	30	616	30	--	--	2,024
Pope	--	9	19	--	8	--	34	68	7	--	218
Red Lake	--	--	1	--	--	--	25	2	--	--	30
Sibley	--	4	11	--	48	150	55	--	--	--	622
Steele	--	5	7	--	5	2	46	16	3	--	107
Stevens	--	4	4	--	--	--	1	--	--	--	10
Swift	--	--	1	--	--	--	--	2	--	--	3
Waseca	--	68	5	--	--	--	13	3	3	5	97
Total	--	1,234	1,030	--	133	324	2,194	646	127	15	7,717
STATE TOTAL	71	3,339	3,118	230	1,247	1,578	42,107	9,338	863	101	264,616

1/ International 1/4-inch rule.

Table 14.--Saw-log receipts in Minnesota by Forest Survey Unit, species group, and State of origin, 1990

(In thousand board feet) 1/

Species group	ALL UNITS				
	Total	Minnesota	Wisconsin	Iowa	Other
SOFTWOODS					
Cedar	1,819	1,819	--	--	--
Balsam fir	3,517	3,517	--	--	--
Jack pine	21,612	20,684	928	--	--
Red pine	34,127	32,907	1,219	--	1
White pine	15,296	14,456	829	--	11
Spruce	4,959	4,949	9	--	1
Tamarack	263	263	--	--	--
Total	81,593	78,595	2,985	--	13
HARDWOODS					
Ash	7,508	7,478	10	20	--
Aspen	82,855	82,753	42	--	60
Balsam poplar	201	201	--	--	--
Basswood	13,125	12,997	16	104	8
Paper birch	16,931	16,928	3	--	--
Yellow birch	43	31	--	12	--
Cottonwood	2,617	2,617	--	--	--
Elm	3,114	3,047	5	32	30
Hickory	240	191	5	44	--
Hard maple	941	913	4	24	--
Soft maple	1,077	1,062	3	12	--
Red oak	38,474	37,372	122	980	--
White oak	8,493	8,128	--	365	--
Walnut	396	384	--	12	--
Other hardwoods	35	35	--	--	--
Total	176,050	174,137	210	1,605	98
All species	257,643	252,732	3,195	1,605	111

(Table 14 continued on next page)

(Table 14 continued)

Species group	Total	Minnesota	Wisconsin	Iowa	Other
ASPEN-BIRCH UNIT					
SOFTWOODS					
Cedar	602	602	--	--	--
Balsam fir	235	235	--	--	--
Jack pine	6,355	5,444	911	--	--
Red pine	14,230	13,030	1,199	--	1
White pine	8,936	8,105	820	--	11
Spruce	4,794	4,784	9	--	1
Tamarack	57	57	--	--	--
Total	35,209	32,257	2,939	--	13
HARDWOODS					
Ash	780	780	--	--	--
Aspen	16,399	16,339	--	--	60
Balsam poplar	162	162	--	--	--
Basswood	35	35	--	--	--
Paper birch	7,261	7,261	--	--	--
Yellow birch	3	3	--	--	--
Hard maple	23	23	--	--	--
Red oak	52	52	--	--	--
White oak	50	50	--	--	--
Total	24,765	24,705	--	--	60
All species	59,974	56,962	2,939	--	73
NORTHERN PINE UNIT					
SOFTWOODS					
Cedar	1,210	1,210	--	--	--
Balsam fir	3,274	3,274	--	--	--
Jack pine	14,201	14,201	--	--	--
Red pine	18,343	18,343	--	--	--
White pine	5,678	5,678	--	--	--
Spruce	165	165	--	--	--
Tamarack	142	142	--	--	--
Total	43,013	43,013	--	--	--
HARDWOODS					
Ash	4,785	4,785	--	--	--
Aspen	59,973	59,973	--	--	--
Balsam poplar	39	39	--	--	--
Basswood	7,155	7,147	--	--	8
Paper birch	8,758	8,758	--	--	--
Yellow birch	200	200	--	--	--
Elm	1,426	1,396	--	--	30
Hard maple	189	189	--	--	--
Soft maple	283	283	--	--	--
Red oak	13,244	13,244	--	--	--
White oak	726	726	--	--	--
Walnut	1	1	--	--	--
Other hardwoods	3	3	--	--	--
Total	96,782	96,744	--	--	38
All species	139,795	139,757	--	--	38

(Table 14 continued on next page)

(Table 14 continued)

Species group	Total	Minnesota	Wisconsin	Iowa	Other
CENTRAL HARDWOOD UNIT					
SOFTWOODS					
Cedar	2	2	--	--	--
Balsam fir	8	8	--	--	--
Jack pine	1,053	1,036	17	--	--
Red pine	1,546	1,526	20	--	--
White pine	682	673	9	--	--
Tamarack	19	19	--	--	--
Total	3,310	3,264	46	--	--
HARDWOODS					
Ash	1,294	1,264	10	20	--
Aspen	6,310	6,268	42	--	--
Balsam poplar	--	--	--	--	--
Basswood	3,877	3,757	16	104	--
Paper birch	904	901	3	--	--
Yellow birch	40	28	--	12	--
Cottonwood	655	655	--	--	--
Elm	1,268	1,231	5	32	--
Hickory	240	191	5	44	--
Hard maple	567	539	4	24	--
Soft maple	334	319	3	12	--
Red oak	23,562	22,460	122	980	--
White oak	6,521	6,156	--	365	--
Walnut	226	214	--	12	--
Other hardwoods	27	27	--	--	--
Total	45,825	44,010	210	1,605	--
All species	49,135	47,274	256	1,605	--
PRAIRIE UNIT					
SOFTWOODS					
Cedar	5	5	--	--	--
Jack pine	3	3	--	--	--
Red pine	8	8	--	--	--
White pine	--	--	--	--	--
Tamarack	45	45	--	--	--
Total	61	61	--	--	--
HARDWOODS					
Ash	649	649	--	--	--
Aspen	173	173	--	--	--
Basswood	2,058	2,058	--	--	--
Paper birch	8	8	--	--	--
Cottonwood	1,762	1,762	--	--	--
Elm	420	420	--	--	--
Hickory	--	--	--	--	--
Hard maple	162	162	--	--	--
Soft maple	460	460	--	--	--
Red oak	1,616	1,616	--	--	--
White oak	1,196	1,196	--	--	--
Walnut	169	169	--	--	--
Other hardwoods	5	5	--	--	--
Total	8,678	8,678	--	--	--
All species	8,739	8,739	--	--	--

1/ International 1/4-inch rule.

Table 15.--Veneer log production and receipts in Minnesota for selected years, 1960-1990

(In thousand board feet) 1/

Year	Production	Receipts
1960	10.2	1.1
1963	9.9	3.1
1965	8.5	1.1
1966	6.0	0.5
1968	5.2	0.5
1970	3.5	0.3
1972	4.2	0.4
1975	3.2	0.6
1980	6.5	3.5
1984	5.7	3.0
1988	16.2	11.6
1990	16.7	10.6

1/ International 1/4-inch rule.

Table 16.--Veneer log production and receipts by species group in Minnesota, 1988 and 1990

(In thousand board feet) 1/

	Production			Receipts		
Species group	1988	1990	Change	1988	1990	Change
SOFTWOODS						
White pine	14	11	-3	--	--	--
Total	14	11	-3	--	--	--
HARDWOOS						
Ash	498	1,230	732	--	--	--
Aspen	3,796	1,945	-1,851	3,666	1,914	-1,752
Basswood	1,769	2,507	738	73	--	-73
White birch	7,896	8,646	750	7,800	8,642	842
Yellow birch	37	--	-37	--	--	--
Cottonwood	348	240	-108	5	--	-5
Elm	143	146	3	--	--	--
Hard maple	62	172	110	--	--	--
Soft maple	364	23	-341	42	--	-42
Red oak	989	787	-202	--	--	--
White oak	158	659	501	--	--	--
Walnut	99	309	210	--	--	--
Other hardwoods	--	7	7	--	--	--
Total	16,159	16,671	512	11,586	10,556	-1,030
All species	16,173	16,682	509	11,586	10,556	-1,030

1/ International 1/4-inch rule.

Table 17.-- Veneer log and bolt production in Minnesota by species group and destination, 1990

(In thousand board feet) 1/

Species	Total	Destination				
		Minnesota	Wisconsin	Michigan	Indiana	Overseas
SOFTWOODS						
White pine	11	--	11	--	--	--
Total	11	--	11	--	--	--
HARDWOODS						
Ash	1,230	--	49	3	--	1,178
Aspen	1,945	1,914	20	--	--	11
Basswood	2,507	--	592	--	--	1,915
White birch	8,646	8,642	4	--	--	--
Cottonwood	240	--	197	--	--	43
Elm	146	--	--	--	--	146
Hard maple	172	--	78	94	--	--
Soft maple	23	--	23	--	--	--
Red oak	787	--	449	49	--	289
White oak	659	--	289	86	--	284
Walnut	309	--	--	9	47	253
Other hardwoods	7	--	--	7	--	--
Total	16,671	10,556	1,701	248	47	4,119
All species	16,682	10,556	1,712	248	47	4,119

1/ International 1/4-inch rule.

Table 18.--Veneer log receipts in Minnesota by area of origin for selected years, 1960-1990

(In million board feet) 1/

Year	All areas	Area of origin	
		Minnesota	2/ Canada
1960	1.1	1.1	--
1963	3.1	3.0	0.1
1965	1.1	1.1	--
1966	0.5	0.5	--
1968	0.5	0.5	--
1970	0.3	0.3	--
1972	0.4	0.4	--
1975	0.6	0.6	--
1980	3.5	3.5	--
1984	3.0	3.0	--
1988	11.6	11.6	--
1990	10.6	10.6	--

1/ International 1/4-inch rule.

2/ Includes only logs and bolts shipped to Canadian mills for processing.

Table 19.-- Veneer log and bolt receipts in Minnesota by species group and area of origin, 1990

(In thousand board feet) 1/

Species group	Total	Minnesota
Ash	--	--
Aspen	1,914	1,914
Basswood	--	--
White birch	8,642	8,642
Basswood	--	--
Cottonwood	--	--
Soft maple	--	--
All species	10,556	10,556

1/ International 1/4-inch rule.

Table 20.-- Growing-stock removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, Minnesota, 1990

(In thousand cubic feet)

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tama-rack	Ash	Aspen	Balsam poplar	Bass-wood	White birch
ASPEN-BIRCH UNIT												
Carlton	--	973	137	122	59	151	3	43	2,110	245	26	842
Cook	--	649	121	148	148	1,981	6	--	2,555	2	--	306
Koochiching	279	2,501	717	637	137	4,686	138	144	17,776	898	88	129
Lake	3	855	636	462	434	1,459	17	9	5,535	75	--	1,525
St. Louis	305	4,424	2,941	1,612	904	3,275	68	90	27,533	1,597	54	1,272
Total	587	9,402	4,552	2,981	1,682	11,552	232	286	55,509	2,817	168	4,074
NORTHERN PINE UNIT												
Aitkin	--	417	77	92	39	110	3	224	6,860	599	230	219
Becker	--	88	167	124	75	9	--	27	4,279	13	148	23
Beltrami	96	962	1,044	630	120	637	101	289	11,777	38	246	526
Cass	6	672	1,586	1,062	209	117	3	88	14,491	73	142	446
Clearwater	--	165	82	41	23	178	7	58	6,592	14	67	22
Crow Wing	--	56	414	212	20	14	8	34	4,853	22	49	46
Hubbard	--	38	806	421	107	25	1	10	3,562	96	32	167
Itasca	121	4,199	1,262	2,436	451	1,548	11	280	27,027	242	623	926
Lake of theWoods	23	164	1,576	69	14	715	11	5	2,017	22	--	7
Mahnomen	--	--	9	3	2	--	--	4	725	--	89	--
Roseau	--	5	1,356	28	--	51	11	1	921	13	--	--
Wadena	--	11	440	64	7	--	--	9	1,260	8	--	24
Total	246	6,777	8,819	5,182	1,067	3,404	156	1,029	84,364	1,140	1,626	2,406
CENTRAL HARDWOOD UNIT												
Anoka	--	--	--	1	1	--	--	--	3	--	1	--
Benton	--	--	--	4		--	--	--	10	--	8	--
Carver	--	--	--	--	--	--	--	--	1	--	--	--
Chisago	--	--	--	1	--	--	--	27	7	--	58	--
Dakota	--	--	--	--	--	--	--	--	--	--	--	--
Douglas	--	--	--	1	--	--	--	6	2	--	26	1
Fillmore	--	--	--	--	--	--	--	15	14	--	131	--
Goodhue	--	--	--	--	--	--	--	8	11	--	149	--
Hennepin	--	--	--	--	--	--	--	--	6	--	1	--
Houston	--	--	--	--	--	--	--	25	45	--	172	1
Isanti	--	--	21	36	22	--	--	1	2	--	1	--
Kanabec	--	--	36	57	21	--	--	39	636	--	86	29
Le Sueur	--	--	--	--	--	--	--	4	--	--	--	--
Mille Lacs	--	--	4	3	1	--	--	8	2,948	3	58	7
Morrison	--	--	189	27	2	--	--	5	783	--	28	2
Olmstead	--	--	--	--	--	--	--	7	3	--	46	--
Otter Tail	--	--	--	1	7	--	2	16	19	--	38	1
Pine	35	6	148	198	51	23	1	101	4,447	290	107	202
Rice	--	--	--	--	--	--	--	22	7	--	69	--
Scott	--	--	--	--	--	--	--	--	1	--	--	--
Sherburne	--	--	47	185	2	1	--	--	--	--	--	--
Stearns	--	--	--	--	--	--	--	26	3	--	49	--
Todd	--	--	6	3	--	--	1	11	300	--	11	9
Wabasha	--	--	--	--	--	--	--	12	8	--	117	--
Washington	--	--	--	--	--	--	--	1	1	--	1	--
Winona	--	--	--	--	--	--	--	17	14	--	142	1
Wright	--	--	--	--	--	--	--	2	--	--	6	--
Total	35	6	451	517	107	24	4	353	9,271	293	1,305	253

(Table 20 continued on next page)

(Table 20 continued)

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tama-rack	Ash	Aspen	Balsam poplar	Bass-wood	White birch
PRAIRIE UNIT												
Blue Earth	--	--	--	--	--	--	--	1	--	--	5	--
Brown	--	--	--	--	--	--	--	1	--	--	8	--
Clay	--	--	--	--	--	--	--	1	1	--	7	1
Dodge	--	--	--	--	--	--	--	1	3	--	40	--
Faribault	--	--	--	--	--	--	--	--	--	--	4	--
Freeborn	--	--	--	--	--	--	--	6	--	--	--	--
Jackson	--	--	--	--	--	--	--	--	--	--	--	--
Kandiyohi	--	--	--	--	--	--	--	8	--	--	6	--
Kittson	--	--	--	--	--	--	--	7	--	--	9	--
Lincoln	--	--	--	1	--	--	--	--	--	--	--	--
Lyon	--	--	--	--	--	--	--	--	--	--	--	--
Mcleod	--	--	--	--	--	--	--	10	2	--	12	--
Marshall	--	--	1	--	--	--	1	--	3	--	--	--
Meeker	--	--	--	--	--	--	--	8	--	--	7	--
Mower	--	--	--	1	--	--	--	--	--	--	--	--
Murray	--	--	--	--	--	--	--	--	--	--	--	--
Nicollet	--	--	--	--	--	--	--	6	--	--	14	--
Nobles	--	--	--	--	--	--	--	1	--	--	--	--
Norman	--	--	--	--	--	--	--	11	--	--	18	--
Pennington	--	--	--	--	--	--	--	--	37	--	--	--
Pipestone	--	--	--	1	--	--	--	1	--	--	--	--
Polk	1	--	--	--	--	--	1	14	302	--	11	--
Pope	--	--	--	--	--	--	--	7	--	--	7	--
Red Lake	--	--	--	--	--	--	--	--	112	--	--	--
Redwood	--	--	--	--	--	--	--	6	--	--	1	--
Renville	--	--	--	--	--	--	--	6	--	--	1	--
Sibley	--	--	--	--	--	--	--	12	--	--	58	--
Steele	--	--	--	--	--	--	--	--	--	--	4	--
Stevens	--	--	--	--	--	--	--	--	--	--	--	--
Waseca	--	--	--	--	--	--	--	--	--	--	--	--
Total	1	--	1	3	--	--	2	107	460	--	212	1
STATE TOTAL	869	16,185	13,823	8,683	2,856	14,980	394	1,775	149,604	4,250	3,311	6,734

(Table 20 continued on next page)

(Table 20 continued)

Unit and county	Yellow birch	Cotton-wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Walnut	O. hard-woods	All species
ASPEN-BIRCH UNIT											
Carlton	--	--	--	--	27	166	31	--	--	--	4,935
Cook	--	--	--	--	--	2	--	--	--	--	5,918
Koochiching	--	--	9	--	--	2	5	8	--	--	28,154
Lake	--	--	--	--	4	3	1	--	--	--	11,018
St. Louis	--	--	2	--	--	426	18	--	--	--	44,521
Total	--	--	11	--	31	599	55	8	--	--	94,546
NORTHERN PINE UNIT											
Aitkin	--	--	6	--	27	246	379	25	--	--	9,553
Becker	--	--	16	--	1	7	116	37	--	--	5,130
Beltrami	--	--	60	--	2	22	24	26	--	--	16,600
Cass	--	--	13	--	11	15	726	44	--	--	19,704
Clearwater	--	1	28	--	--	--	33	21	--	--	7,332
Crow Wing	--	1	--	--	8	2	377	15	--	--	6,131
Hubbard	--	--	12	--	4	--	13	6	--	--	5,296
Itasca	--	--	6	--	--	242	284	16	--	--	39,678
Lake of theWoods	--	--	1	--	--	--	--	--	--	--	4,624
Mahnomen	--	--	--	--	--	--	5	--	--	--	837
Roseau	--	2	2	--	--	--	--	6	--	--	2,396
Wadena	--	--	--	--	--	--	37	--	--	--	1,860
Total	--	4	144	--	53	534	1,994	196	--	--	119,141
CENTRAL HARDWOOD UNIT											
Anoka	--	--	2	--	--	--	17	3	--	--	28
Benton	--	1	3	--	--	--	12	4	--	--	42
Carver	--	--	2	--	--	--	3	--	--	--	6
Chisago	--	--	--	--	4	9	52	39	--	--	197
Dakota	--	--	2	--	--	--	1	--	--	--	3
Douglas	--	1	6	--	4	2	49	6	1	--	105
Fillmore	2	26	33	9	7	15	656	271	45	1	1,225
Goodhue	--	38	28	2	29	16	239	134	9	--	663
Hennepin	--	--	2	--	--	1	1	--	--	--	11
Houston	2	51	26	22	16	27	952	330	46	2	1,717
Isanti	--	--	--	--	--	--	6	1	--	--	90
Kanabec	--	--	7	--	12	9	316	55	--	--	1,303
Le Sueur	--	72	1	--	--	--	4	7	--	--	88
Mille Lacs	--	1	6	--	2	1	81	30	--	--	3,153
Morrison	--	1	7	--	1	--	51	18	--	--	1,114
Olmstead	--	15	7	--	6	6	123	65	3	2	283
Otter Tail	--	1	13	--	--	2	119	18	--	--	237
Pine	8	--	5	--	24	273	140	8	--	7	6,074
Rice	--	102	23	--	7	14	173	73	20	--	510
Scott	--	1	1	--	--	--	1	--	--	--	4
Sherburne	--	--	--	--	--	--	7	--	--	--	242
Stearns	--	4	16	--	6	10	69	41	1	--	225
Todd	--	--	7	--	--	--	31	8	--	--	387
Wabasha	--	69	28	3	24	26	688	167	22	1	1,165
Washington	--	--	1	--	--	--	5	4	--	--	13
Winona	--	51	31	7	32	26	926	219	39	2	1,507
Wright	--	1	9	--	--	2	11	4	--	--	35
Total	12	435	266	43	174	439	4,733	1,505	186	15	20,427

(Table 20 continued on next page)

(Table 20 continued)

Unit and county	Yellow birch	Cotton-wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Walnut	O. hard-woods	All species
PRAIRIE UNIT											
Blue Earth	--	11	1	--	5	1	1	1	3	--	29
Brown	--	--	--	--	--	--	--	--	--	--	9
Clay	--	7	4	--	--	1	5	--	--	--	27
Dodge	--	2	2	--	--	2	50	33	2	--	135
Faribault	--	11	1	--	--	--	--	--	3	--	19
Freeborn	--	31	1	--	--	--	7	9	--	--	54
Jackson	--	1	--	--	--	--	--	--	--	--	1
Kandiyohi	--	4	2	--	1	--	5	8	1	--	35
Kittson	--	1	64	--	8	--	59	9	--	1	158
Lincoln	--	--	--	--	--	--	--	--	--	--	1
Lyon	--	7	1	--	--	--	--	--	--	1	9
Mcleod	--	4	3	--	1	6	4	6	--	--	48
Marshall	--	1	37	--	--	--	59	--	--	--	102
Meeker	--	6	6	--	1	--	5	8	1	--	42
Mower	--	1	1	--	--	--	4	5	--	--	12
Murray	--	8	1	--	--	--	--	--	--	--	9
Nicollet	--	58	1	--	3	10	19	13	16	--	140
Nobles	--	5	--	--	--	1	--	--	1	--	8
Norman	--	24	7	--	--	11	20	--	--	--	91
Pennington	--	--	--	--	--	--	--	--	--	--	37
Pipestone	--	--	--	--	--	--	1	--	--	--	3
Polk	--	42	79	--	--	6	102	9	--	--	567
Pope	--	1	4	--	1	--	5	11	1	--	37
Red Lake	--	--	--	--	--	--	4	--	--	--	116
Redwood	--	4	--	--	--	--	--	--	--	--	11
Renville	--	2	--	--	--	--	--	--	2	--	11
Sibley	--	1	2	--	9	29	10	1	--	--	122
Steele	--	1	1	--	1	--	8	3	--	--	18
Stevens	--	1	1	--	--	--	--	--	--	--	2
Waseca	--	14	1	--	--	--	3	--	--	1	19
Total	--	248	220	--	30	67	371	116	30	3	1,872
STATE TOTAL	12	687	641	43	288	1,639	7,153	1,825	216	18	235,986

Table 21.-- Sawtimber removals from timberland for industrial roundwood by Forest Survey Unit, county, and species group, Minnesota, 1990

(In thousand board feet) 1/

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tama-rack	Ash	Aspen	Balsam poplar	Bass-wood	White birch
ASPEN-BIRCH UNIT												
Carlton	--	2,271	480	491	323	366	8	192	5,651	670	120	3,130
Cook	--	1,608	513	815	828	5,607	25	--	7,525	5	--	1,482
Koochiching	783	6,205	2,392	2,792	705	11,458	327	638	51,619	2,453	413	570
Lake	13	2,013	2,368	2,483	2,412	3,665	41	29	15,267	202	--	4,890
St. Louis	712	10,543	9,941	7,590	4,494	7,877	169	387	75,102	4,377	263	5,247
Total	1,508	22,640	15,694	14,171	8,762	28,973	570	1,246	155,164	7,707	796	15,319
NORTHERN PINE UNIT												
Aitkin	1	992	309	474	219	262	8	1,085	19,055	1,640	1,125	1,084
Becker	--	205	695	673	419	22	--	130	11,806	36	704	108
Beltrami	415	2,255	3,735	2,630	633	1,583	248	1,358	33,177	107	1,164	2,388
Cass	28	1,753	5,962	5,629	1,128	273	7	403	42,267	198	690	2,077
Clearwater	--	390	308	196	128	429	23	278	18,761	39	355	101
Crow Wing	--	136	1,387	1,046	110	34	32	176	13,885	62	254	184
Hubbard	1	90	3,004	2,222	586	68	3	42	9,980	260	155	702
Itasca	442	10,554	4,722	11,059	2,423	3,712	26	1,271	76,667	667	2,956	4,193
Lake of the Woods	106	382	5,050	327	44	1,697	47	25	5,858	59	1	33
Mahnomen	--	--	38	18	12	2	0	24	2,085	2	456	2
Roseau	--	11	4,375	145	--	125	36	3	2,782	36	--	2
Wadena	--	24	1,422	308	42	--	--	38	3,539	24	--	104
Total	993	16,792	31,007	24,727	5,744	8,207	430	4,833	239,862	3,130	7,860	10,978
CENTRAL HARDWOOD UNIT												
Anoka	--	--	--	6	5	--	--	--	8	--	3	--
Benton	--	--	--	21	--	--	--	2	38	--	40	3
Carver	--	--	--	--	--	--	--	--	3	--	1	--
Chisago	--	--	--	4	1	--	--	126	24	--	277	--
Dakota	--	--	--	--	--	--	--	--	--	--	--	--
Douglas	--	--	--	6	--	--	--	24	7	--	120	9
Fillmore	--	--	--	--	--	--	--	74	50	--	630	1
Goodhue	--	--	--	--	--	--	--	42	41	--	732	--
Hennepin	--	--	--	--	--	--	--	--	19	--	3	--
Houston	--	--	--	--	--	--	--	123	158	--	818	4
Isanti	--	--	92	199	118	--	--	7	7	--	3	--
Kanabec	--	--	159	290	114	--	--	203	2,348	--	408	136
Le Sueur	--	--	--	--	--	--	--	18	--	--	1	--
Mille Lacs	--	--	15	13	6	--	--	42	8,621	7	271	30
Morrison	--	--	591	107	13	--	--	21	2,878	2	134	13
Olmstead	--	--	--	--	--	--	--	29	10	--	225	--
Otter Tail	--	--	--	6	40	--	11	75	67	--	178	8
Pine	45	18	572	881	288	56	4	480	12,104	792	478	813
Rice	2	--	--	--	--	--	--	107	24	--	326	--
Scott	--	--	--	--	--	--	--	--	3	--	--	--
Sherburne	--	--	144	550	8	3	--	--	1	--	--	--
Stearns	--	--	--	2	--	--	--	123	10	--	229	--
Todd	--	--	27	16	2	--	3	50	1,312	2	51	47
Wabasha	--	--	--	--	--	--	--	62	30	--	580	--
Washington	--	--	--	--	--	--	--	9	5	--	9	--
Winona	--	--	--	2	--	--	--	79	48	--	685	3
Wright	--	--	--	--	1	--	--	10	--	--	25	--
Total	47	18	1,600	2,103	596	59	18	1,706	27,816	803	6,227	1,067

(Table 21 continued on next page)

(Table 21 continued)

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tamarack	Ash	Aspen	Balsam poplar	Basswood	White birch
PRAIRIE UNIT												
Blue Earth	--	--	--	--	--	--	--	3	--	--	25	--
Brown	--	--	--	--	--	--	--	9	--	--	49	--
Clay	--	--	2	2	--	--	--	7	5	--	30	4
Dodge	--	--	--	--	--	--	--	5	8	--	216	--
Faribault	--	--	--	--	--	--	--	--	--	--	20	--
Freeborn	--	--	--	--	--	--	--	27	--	--	--	--
Grant	--	--	--	--	--	--	--	--	--	--	--	--
Jackson	--	--	--	--	--	--	--	1	--	--	--	--
Kandiyohi	--	--	--	--	--	--	--	40	--	--	28	--
Kittson	--	--	--	--	--	--	--	29	--	--	46	--
Lincoln	--	--	--	3	--	--	--	--	--	--	--	--
Lyon	--	--	--	--	--	--	--	--	--	--	--	--
Mcleod	--	--	--	--	--	--	--	50	7	--	59	--
Marshall	--	--	4	--	--	--	7	1	9	--	--	1
Meeker	--	--	--	--	--	--	--	41	1	--	30	--
Mower	--	--	--	3	--	--	--	--	--	--	--	--
Murray	--	--	--	--	--	--	--	--	--	--	--	--
Nicollet	--	--	--	--	--	--	--	33	--	--	80	--
Nobles	--	--	--	--	--	--	--	3	--	--	--	--
Norman	--	--	--	--	--	--	--	52	--	--	93	--
Pennington	--	--	--	--	--	--	--	0	102	--	--	--
Pipestone	--	--	--	8	--	--	--	3	--	--	--	--
Polk	4	--	1	2	1	--	7	64	930	1	61	1
Pope	--	--	--	--	--	--	--	31	1	--	34	--
Red Lake	--	--	--	--	--	--	--	2	306	--	--	--
Redwood	--	--	--	--	--	--	--	30	--	--	5	--
Renville	--	--	--	--	--	--	--	30	--	--	4	--
Sibley	--	--	--	--	--	--	--	59	--	--	275	--
Steele	--	--	--	--	--	--	--	1	1	--	18	--
Stevens	--	--	--	--	--	--	--	1	--	--	--	--
Swift	--	--	--	--	--	--	--	--	--	--	--	--
Waseca	--	--	--	--	--	--	--	--	--	--	--	--
Total	4	--	7	18	1	--	14	522	1,370	1	1,073	6
STATE TOTAL	2,552	39,450	48,308	41,019	15,103	37,239	1,032	8,307	424,212	11,641	15,956	27,370

(Table 21 continued on next page)

(Table 21 continued)

Unit and county	Yellow birch	Cotton-wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Walnut	O. hard-woods	All species
ASPEN-BIRCH UNIT											
Carlton	--	--	--	--	131	174	127	--	--	--	14,134
Cook	--	--	--	--	--	3	--	--	--	--	18,411
Koochiching	--	--	35	--	--	3	22	36	--	--	80,451
Lake	--	--	--	--	7	5	4	--	--	--	33,399
St. Louis	3	--	3	--	--	486	48	--	--	--	127,242
Total	3	--	38	--	138	671	201	36	--	--	273,637
NORTHERN PINE UNIT											
Aitkin	--	3	25	--	112	293	1,629	99	--	2	28,417
Becker	--	2	74	--	9	31	507	163	--	--	15,584
Beltrami	--	--	274	--	3	99	105	106	--	--	50,280
Cass	--	--	53	--	39	72	3,116	186	--	--	63,881
Clearwater	--	3	134	--	--	1	147	99	--	--	21,392
Crow Wing	--	4	1	--	29	4	1,613	66	--	--	19,023
Hubbard	--	--	59	--	1	0	46	34	--	--	17,253
Itasca	--	--	21	--	7	247	1,213	67	--	--	120,247
Lake of the Woods	--	--	4	--	--	--	2	--	--	--	13,635
Mahnomen	--	--	--	--	--	--	25	--	--	--	2,664
Roseau	--	12	16	--	--	--	--	27	--	--	7,570
Wadena	--	--	--	--	--	--	162	--	--	--	5,663
Total	--	24	661	--	200	747	8,565	847	--	2	365,609
CENTRAL HARDWOOD UNIT											
Anoka	--	--	11	--	--	--	76	12	1	1	123
Benton	--	3	17	--	1	1	50	19	--	--	195
Carver	--	2	11	--	--	1	12	1	--	--	31
Chisago	--	--	1	--	18	44	230	177	--	--	902
Dakota	--	--	13	--	--	--	8	1	--	--	22
Douglas	--	9	23	--	18	14	212	27	9	--	478
Fillmore	11	120	154	46	34	71	2,837	1,306	221	5	5,560
Goodhue	--	192	132	11	147	78	1,027	627	45	--	3,074
Hennepin	--	2	12	--	--	5	8	3	--	--	52
Houston	15	242	123	105	78	127	4,146	1,703	225	10	7,877
Isanti	--	--	2	--	1	--	28	5	--	--	462
Kanabec	--	--	32	--	57	46	1,367	242	--	--	5,402
Le Sueur	--	336	6	--	1	--	18	29	--	--	409
Mille Lacs	--	8	25	--	13	3	351	131	--	--	9,536
Morrison	--	6	29	--	8	3	223	80	--	--	4,108
Olmstead	--	69	35	1	35	25	545	301	21	14	1,310
Otter Tail	--	7	62	--	2	14	515	80	--	--	1,065
Pine	37	1	21	1	112	442	608	37	--	35	17,825
Rice	--	487	106	2	33	65	752	322	96	--	2,322
Scott	--	5	5	--	--	1	9	2	--	--	25
Sherburne	--	--	1	--	--	--	29	1	--	--	737
Stearns	--	18	75	--	27	48	299	184	6	--	1,021
Todd	--	2	29	--	--	1	145	32	--	--	1,719
Wabasha	--	337	130	17	117	118	2,962	717	104	8	5,182
Washington	--	--	6	--	--	--	27	24	--	--	80
Winona	--	252	147	29	149	124	4,022	1,036	196	10	6,782
Wright	--	9	43	--	--	16	46	16	--	--	166
Total	63	2,107	1,251	212	851	1,247	20,552	7,115	924	83	76,465

(Table 21 continued on next page)

(Table 21 continued)

Unit and county	Yellow birch	Cotton-wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Walnut	O. hard-woods	All species
PRAIRIE UNIT											
Blue Earth	--	50	7	--	24	4	5	5	15	--	138
Brown	--	--	--	--	--	--	--	--	--	--	58
Clay	--	32	18	--	--	9	24	1	--	--	134
Dodge	--	13	12	--	--	11	216	150	9	--	640
Faribault	--	51	5	--	--	--	1	--	19	--	96
Freeborn	--	143	3	--	--	--	28	43	--	--	244
Grant	--	1	2	--	--	--	--	--	--	--	3
Jackson	--	5	--	--	--	1	1	--	1	--	9
Kandiyohi	--	18	10	--	6	--	22	35	7	--	166
Kittson	--	4	299	--	37	--	250	41	--	4	710
Lincoln	--	--	--	--	--	--	--	--	--	--	3
Lyon	--	35	3	--	--	--	--	--	--	4	42
Mcleod	--	18	17	--	7	24	19	30	--	--	231
Marshall	--	4	175	--	--	--	250	--	--	--	451
Meeker	--	24	23	--	6	--	23	32	7	--	187
Mower	--	5	3	--	--	--	19	22	--	--	52
Murray	--	37	9	--	--	--	--	--	--	--	46
Nicollet	--	272	7	--	19	48	93	61	77	--	690
Nobles	--	20	2	--	--	3	3	--	3	--	34
Norman	--	117	29	--	--	50	84	3	--	--	428
Pennington	--	--	--	--	--	--	--	--	--	--	102
Pipestone	--	--	--	--	--	--	5	--	--	--	16
Polk	--	198	398	--	--	27	440	45	--	--	2,180
Pope	--	8	18	--	7	--	25	48	6	--	178
Red Lake	--	--	1	--	--	--	18	1	--	--	328
Redwood	--	22	--	--	--	--	--	--	--	--	57
Renville	--	10	--	--	--	--	--	--	15	--	59
Sibley	--	3	10	--	44	137	48	9	--	--	585
Steele	--	4	6	--	4	2	32	12	3	--	83
Stevens	--	3	3	--	--	--	1	--	--	--	8
Swift	--	--	1	--	--	--	--	1	--	--	2
Waseca	--	62	4	--	--	--	10	2	3	4	85
Total	--	1,159	1,065	--	154	316	1,617	541	165	12	8,045
STATE TOTAL	66	3,290	3,015	212	1,343	2,981	30,935	8,539	1,089	97	723,756

1/ International 1/4-inch rule.

Table 22.-- Harvest residue generated by industrial roundwood harvesting from timberland by Forest Survey Unit, county, and species group, Minnesota, 1990

(In thousand cubic feet)

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tamarack	Ash	Aspen	Balsam poplar	Basswood	White birch
ASPEN-BIRCH UNIT												
Carlton	--	429	67	53	25	68	1	22	754	108	15	376
Cook	--	291	68	60	60	930	4	--	1,179	2	--	154
Koochiching	112	1,107	334	239	57	2,096	61	73	7,977	396	50	66
Lake	1	378	154	190	178	658	8	4	2,417	34	--	735
St. Louis	116	1,954	1,382	670	380	1,455	30	42	11,773	707	28	576
Total	229	4,159	2,005	1,212	700	5,207	104	141	24,100	1,247	93	1,907
NORTHERN PINE UNIT												
Aitkin	--	186	40	37	16	49	1	116	2,857	265	122	108
Becker	--	39	90	51	30	4	--	15	1,903	7	81	13
Beltrami	54	424	516	214	50	287	44	156	5,315	18	136	279
Cass	4	299	749	434	86	52	1	40	6,438	32	75	220
Clearwater	--	74	42	16	9	79	3	31	2,999	7	30	13
Crow Wing	--	25	166	89	8	7	3	17	2,169	10	23	20
Hubbard	--	17	403	176	44	11	--	4	1,600	42	17	91
Itasca	63	1,862	595	891	187	688	4	145	11,891	107	343	489
Lake of the Woods	13	72	729	29	6	317	6	2	912	9	--	4
Mahnomen	--	--	5	1	1	--	--	1	333	--	43	--
Roseau	--	2	614	11	--	23	6	--	382	7	--	--
Wadena	--	4	162	27	3	--	--	3	566	3	--	13
Total	134	3,004	4,111	1,976	440	1,517	68	530	37,365	507	870	1,250
CENTRAL HARDWOOD UNIT												
Anoka	--	--	--	--	--	--	--	--	1	--	--	--
Benton	--	--	--	1	--	--	--	--	5	--	4	--
Carver	--	--	--	--	--	--	--	--	--	--	--	--
Chisago	--	--	--	--	--	--	--	15	3	--	32	--
Dakota	--	--	--	--	--	--	--	--	--	--	--	--
Douglas	--	--	--	--	--	--	--	4	2	--	15	1
Fillmore	--	--	--	--	--	--	--	8	7	--	71	--
Goodhue	--	--	--	--	--	--	--	5	5	--	79	--
Hennepin	--	--	--	--	--	--	--	--	3	--	--	--
Houston	--	--	--	--	--	--	--	13	25	--	96	--
Isanti	--	--	11	15	9	--	--	1	1	--	--	--
Kanabec	--	--	19	21	8	--	--	19	240	--	48	16
Le Sueur	--	--	--	--	--	--	--	2	--	--	--	--
Mille Lacs	--	--	2	1	--	--	--	5	1,258	1	32	4
Morrison	--	--	27	8	1	--	--	4	273	--	16	1
Olmstead	--	--	--	--	--	--	--	4	1	--	24	--
Otter Tail	--	--	--	--	3	--	1	9	9	--	21	1
Pine	4	3	75	81	21	10	--	56	1,805	128	58	96
Rice	--	--	--	--	--	--	--	12	3	--	37	--
Scott	--	--	--	--	--	--	--	--	--	--	--	--
Sherburne	--	--	7	68	1	--	--	--	--	--	--	--
Stearns	--	--	--	--	--	--	--	14	1	--	28	--
Todd	--	--	3	1	--	--	--	6	79	--	6	4
Wabasha	--	--	--	--	--	--	--	6	3	--	60	--
Washington	--	--	--	--	--	--	--	--	1	--	--	--
Winona	--	--	--	--	--	--	--	9	8	--	76	--
Wright	--	--	--	--	--	--	--	1	--	--	4	--
Total	4	3	144	196	43	10	1	193	3,733	129	707	123

(Table 22 continued on next page)

(Table 22 continued)

Unit and county	Cedar	Balsam fir	Jack pine	Red pine	White pine	Spruce	Tamarack	Ash	Aspen	Balsam poplar	Basswood	White birch
PRAIRIE UNIT												
Blue Earth	--	--	--	--	--	--	--	--	--	--	2	--
Brown	--	--	--	--	--	--	--	--	--	--	3	--
Clay	--	--	--	--	--	--	--	1	1	--	4	--
Dodge	--	--	--	--	--	--	--	--	1	--	17	--
Faribault	--	--	--	--	--	--	--	--	--	--	2	--
Freeborn	--	--	--	--	--	--	--	4	--	--	--	--
Kandiyohi	--	--	--	--	--	--	--	4	--	--	4	--
Kittson	--	--	--	--	--	--	--	4	--	--	4	--
Lyon	--	--	--	--	--	--	--	--	--	--	--	--
Mcleod	--	--	--	--	--	--	--	4	2	--	6	--
Marshall	--	--	--	--	--	--	1	--	1	--	--	--
Meeker	--	--	--	--	--	--	--	4	--	--	4	--
Mower	--	--	--	--	--	--	--	--	--	--	--	--
Murray	--	--	--	--	--	--	--	--	--	--	--	--
Nicollet	--	--	--	--	--	--	--	2	--	--	6	--
Nobles	--	--	--	--	--	--	--	--	--	--	--	--
Norman	--	--	--	--	--	--	--	6	--	--	11	--
Pennington	--	--	--	--	--	--	--	--	16	--	--	--
Pipestone	--	--	--	1	--	--	--	--	--	--	--	--
Polk	--	--	--	--	--	--	1	8	146	--	5	--
Pope	--	--	--	--	--	--	--	4	--	--	4	--
Red Lake	--	--	--	--	--	--	--	--	50	--	--	--
Redwood	--	--	--	--	--	--	--	2	--	--	--	--
Renville	--	--	--	--	--	--	--	2	--	--	--	--
Sibley	--	--	--	--	--	--	--	5	--	--	33	--
Steele	--	--	--	--	--	--	--	--	--	--	2	--
Waseca	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	1	--	--	2	50	217	--	107	--
STATE TOTAL	367	7,166	6,260	3,385	1,183	6,734	175	914	65,415	1,883	1,777	3,280

(Table 22 continued on next page)

(Table 22 continued)

Unit and county	Yellow birch	Cotton-wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Walnut	O. hard-woods	All species
ASPEN-BIRCH UNIT											
Carlton	--	--	--	--	13	13	29	--	--	--	1,973
Cook	--	--	--	--	--	--	--	--	--	--	2,748
Koochiching	--	--	4	--	--	--	5	8	--	--	12,585
Lake	--	--	--	--	--	--	--	--	--	--	4,757
St. Louis	--	--	--	--	--	58	6	0	--	--	19,177
Total	--	--	4	--	13	71	40	8	--	--	41,240
NORTHERN PINE UNIT											
Aitkin	--	--	4	--	13	40	370	21	--	--	4,245
Becker	--	--	9	--	1	4	110	34	--	--	2,391
Beltrami	--	--	32	--	--	13	24	21	--	--	7,583
Cass	--	--	4	--	4	9	692	37	--	--	9,176
Clearwater	--	--	16	--	--	--	32	18	--	--	3,369
Crow Wing	--	--	--	--	4	--	364	16	--	--	2,921
Hubbard	--	--	6	--	--	--	8	5	--	--	2,424
Itasca	--	--	2	--	--	18	274	16	--	--	17,575
Lake of the Woods	--	--	--	--	--	--	--	--	--	--	2,099
Mahnomen	--	--	--	--	--	--	5	--	--	--	389
Roseau	--	1	1	--	--	--	--	5	--	--	1,052
Wadena	--	--	--	--	--	--	37	--	--	--	818
Total	--	1	74	--	22	84	1,916	173	--	--	54,042
CENTRAL HARDWOOD UNIT											
Anoka	--	--	1	--	--	--	18	3	--	--	23
Benton	--	--	1	--	--	--	11	5	--	--	27
Carver	--	--	1	--	--	--	3	--	--	--	4
Chisago	--	--	--	--	2	4	47	36	--	--	139
Dakota	--	--	1	--	--	--	2	--	--	--	3
Douglas	--	1	4	--	2	1	48	5	1	--	84
Fillmore	1	15	19	4	4	9	634	231	24	--	1,027
Goodhue	--	20	15	1	15	10	233	108	4	--	495
Hennepin	--	--	1	--	--	--	2	--	--	--	6
Houston	1	28	15	12	10	15	909	259	24	1	1,408
Isanti	--	--	--	--	--	--	5	--	--	--	42
Kanabec	--	--	4	--	6	4	304	50	--	--	739
Le Sueur	--	40	--	--	--	--	5	7	--	--	54
Mille Lacs	--	1	4	--	1	--	80	29	--	--	1,418
Morrison	--	--	4	--	1	--	50	18	--	--	403
Olmstead	--	9	4	--	2	4	114	54	2	1	219
Otter Tail	--	1	6	--	--	1	116	18	--	--	186
Pine	4	--	4	--	13	69	137	8	--	3	2,575
Rice	--	56	13	--	4	8	168	71	11	--	383
Scott	--	--	--	--	--	--	2	--	--	--	2
Sherburne	--	--	--	--	--	--	7	--	--	--	83
Stearns	--	2	9	--	4	4	64	39	--	--	165
Todd	--	--	4	--	--	--	27	8	--	--	138
Wabasha	--	38	15	1	13	14	670	160	13	1	994
Washington	--	--	--	--	--	--	2	2	--	--	5
Winona	--	26	17	4	18	15	885	193	20	1	1,272
Wright	--	1	4	--	--	1	11	3	--	--	25
Total	6	238	146	22	95	159	4,554	1,307	99	7	11,919

(Table 22 continued on next page)

(Table 22 continued)

Unit and county	Yellow birch	Cotton-wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Walnut	O. hard-woods	All species
PRAIRIE UNIT											
Blue Earth	--	6	1	--	2	--	--	--	--	--	11
Brown	--	--	--	--	--	--	--	--	--	--	3
Clay	--	4	2	--	--	1	5	--	--	--	18
Dodge	--	1	1	--	--	1	48	31	--	--	100
Faribault	--	6	--	--	--	--	--	--	2	--	10
Freeborn	--	17	--	--	--	--	6	10	--	--	37
Kandiyohi	--	2	1	--	--	--	5	8	1	--	25
Kittson	--	--	36	--	4	--	57	8	--	--	113
Lyon	--	3	--	--	--	--	--	--	--	--	3
Mcleod	--	2	1	--	1	4	3	5	--	--	28
Marshall	--	--	20	--	--	--	57	--	--	--	79
Meeker	--	4	4	--	--	--	5	8	1	--	30
Mower	--	--	--	--	--	--	5	5	--	--	10
Murray	--	4	1	--	--	--	--	--	--	--	5
Nicollet	--	32	--	--	1	6	15	10	8	--	80
Nobles	--	3	--	--	--	--	--	--	--	--	3
Norman	--	13	4	--	--	6	19	--	--	--	59
Pennington	--	--	--	--	--	--	--	--	--	--	16
Pipestone	--	--	--	--	--	--	--	--	--	--	1
Polk	--	23	41	--	--	4	99	7	--	--	334
Pope	--	1	2	--	1	--	5	11	--	--	28
Red Lake	--	--	--	--	--	--	5	--	--	--	55
Redwood	--	2	--	--	--	--	--	--	--	--	4
Renville	--	--	--	--	--	--	--	--	1	--	3
Sibley	--	--	1	--	4	16	8	--	--	--	67
Steele	--	--	0	--	--	--	8	3	--	--	13
Waseca	--	7	0	--	--	--	3	--	--	--	10
Total	--	130	115	--	13	38	353	106	13	--	1,145
STATE TOTAL	6	369	339	22	143	352	6,863	1,594	112	7	108,346

Table 23.-- Residue produced at primary wood-using mills by type of material, type of use, and Survey Unit, Minnesota, 1990

(In thousand tons, green weight)

Unit and type of use	Wood residue							
	Total		Coarse 1/		Fine 2/		Bark	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
ASPEN-BIRCH UNIT								
Fiber products	41.13	19.56	41.13	19.56	--	--	--	--
Charcoal	0.01	0.01	0.01	0.01	--	--	--	--
Industrial fuel	13.74	26.88	0.28	16.39	13.46	10.49	116.33	323.58
Domestic fuel	3.84	1.99	3.84	1.99	--	--	1.56	1.38
Miscellaneous 3/	2.87	2.52	--	2.06	2.87	0.46	--	--
Not used	14.39	22.89	2.98	1.43	11.41	21.46	12.23	14.70
Total	75.98	73.85	48.24	41.44	27.74	32.41	130.12	339.66
NORTHERN PINE UNIT								
Fiber products	32.39	52.39	32.39	52.39	--	--	--	--
Charcoal	--	2.79	--	2.79	--	--	--	1.18
Industrial fuel	26.64	64.41	6.63	23.32	20.01	41.09	72.57	368.06
Domestic fuel	6.27	21.66	6.23	21.49	0.04	0.17	1.64	6.12
Miscellaneous 3/	4.07	5.67	2.05	3.23	2.02	2.44	0.67	2.12
Not used	21.77	58.16	10.37	26.46	11.40	31.70	7.54	24.58
Total	91.14	205.08	57.67	129.68	33.47	75.40	82.42	402.06
CENTRAL HARDWOOD UNIT								
Fiber products	1.62	8.01	1.62	8.01	--	--	0.17	2.05
Charcoal	0.01	0.10	0.01	0.10	--	--	0.01	0.05
Industrial fuel	1.48	13.46	0.35	4.32	1.13	9.14	1.63	64.18
Domestic fuel	1.38	29.36	1.38	28.63	--	0.73	0.04	3.42
Miscellaneous 3/	0.41	29.23	--	9.00	0.41	20.23	--	13.42
Not used	2.08	23.15	1.04	13.29	1.04	9.86	2.30	6.49
Total	6.98	103.31	4.40	63.35	2.58	39.96	4.15	89.61
PRAIRIE UNIT								
Industrial fuel	--	0.58	--	0.58	--	--	--	1.10
Domestic fuel	0.09	2.40	0.08	2.35	0.01	0.05	--	0.55
Miscellaneous 3/	0.01	9.75	--	4.26	0.01	5.49	--	2.88
Not used	0.02	5.66	--	4.41	0.02	1.25	0.01	1.62
Total	0.12	18.39	0.08	11.60	0.04	6.79	0.01	6.15
ALL UNITS								
Fiber products	75.14	79.96	75.14	79.96	--	--	0.17	2.05
Charcoal	0.02	2.90	0.02	2.90	--	--	0.01	1.23
Industrial fuel	41.86	105.33	7.26	44.61	34.60	60.72	190.53	756.92
Domestic fuel	11.58	55.41	11.53	54.46	0.05	0.95	3.24	11.47
Miscellaneous 3/	7.36	47.17	2.05	18.55	5.31	28.62	0.67	18.42
Not used	38.26	109.86	14.39	45.59	23.87	64.27	22.08	47.39
Total	174.22	400.63	110.39	246.07	63.83	154.56	216.70	837.48

1/ Suitable for chipping such as slabs, edgings, veneer cores, etc.

2/ Not suitable for chipping such as sawdust, veneer clippings, etc.

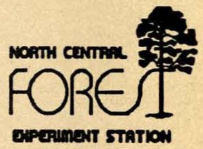
3/ Livestock bedding, mulch, small dimension, and specialty items.

The policy of the United States Department of Agriculture Forest Service prohibits discrimination on the basis of race, color, national origin, age, religion, sex, or disability. Persons believing they have been discriminated against in any Forest Service related activity should write to: Chief, Forest Service, USDA, Washington, DC 20250.

☆U.S. GOVERNMENT PRINTING OFFICE: 1993 - 757-773/60330

Hackett, Ronald L.; Dahlman, Richard A.
1993. **Minnesota timber industry—an assessment of timber product output and use, 1990**. Resour. Bull. NC-143. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 52 p.

Discusses recent Minnesota forest industry trends; production and receipts of pulpwood, saw logs, and veneer logs; and production of other timber products in 1990. Reports on logging residue, wood and bark residue generated at primary wood-using mills, and disposition of mill residues.

KEY WORDS: Pulpwood, saw logs, veneer logs, residue

Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.